Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-741
(In full)
bn/M

Beliaeva, A. S.

Bor'ba s vreditelíami i bolezníami ovoshchnykh kul'tur.

[Control of pests and diseases of vegetable crops.]

Sad i Ogorod, no. 3, p. 37-40, Mar. 1956. 80 Sa18

(In Russian)

In a Moscow suburban sovkhoz "imeni M. Gor'kogo" great attention is being given to the control of diseases and pests of vegetable crops. Prophylactic measures of control start with a treatment of seeds. Cabbage seeds are treated against slimy bacteriosis and phomosis; for this purpose we hold them for 15 minutes in a solution MIUIF-1 (10 cubic cm of the 1.5% MIUIF-1 per 4 l of water).

Tomato seeds are disinfected in two solutions: MIUIF-1 and potassium permanganate (for the control of bacterial canker and virus diseases). The seeds are kept in 1% solution of potassium permanganate for 30 minutes. Sprouting ability is not destroyed, plants become more resistant to diseases and develop normally.

The sovkhoz undertakes a strong control of rodents. The matter is that every year for warming of hotbeds 90 thousands of cubic m of city trash are brought in, and this becomes a nursery for the rodents. In 1955 we cleared these pests from 69 thousand hotbed frames, and in 1956 we expect to treat 100 thousand frames.

We start this work at the beginning of March, right after the sowing of cabbage seeds.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

During March and April we distribute around hotbeds poisoned baits of pieces of bread, carrots, wheat grains, covered by phosphidezinc in a ratio of 7-10 g of poison to 1 kg of bait. The grain is first coated by sunflower seed oil. Good results were obtained from white bread baits, which were infected by bacteria of rat typhus (Danieh-Isachenko) with an addition per each kg of bait of 5 g of poison ("krysid") [rat poison].

Last year we used with success green baits: wheat and oat sprouts, also rejected seedlings which we covered with powdered phosphidezinc, krysid or hexachloran dust and then distributed around hotbeds. Beginning with April we dust the thinned seedlings with a mixture of dusts of DDT (Begin p. 56) and of hexachloran (1:1), once every 7-10 days in a dose of 2 g per frame.

Besides this we treat the mice and rat holes with poisons (phosphidezinc, krysid, Paris green) and also put out traps.

In open ground we start control of diseases and pests from the moment of planting seeds, onion sets and cabbage seedlings. Of late we received good results from dusting the cabbage seeds, which were planted into hotbeds, and seeds of radished and beets with a mixture of DDT and hexachloran (1:1). When cabbage seeds were dusted (2 g of mixture for each kg of seeds) damage done by flea bettle to the plants was three times less (8.6% against 16.9% in the control). In 1955 on fields where radish seeds were dusted with hexachloran dust we received a yield of 10 t per ha, while where no dusting was conducted the yield was 2 t; and on the first (dusted) section infestation of root crops by cabbage maggot was not more than 4-5%,

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

whereas on the second field it was 100%.

In 1955 a practician from the Agricultural Academy "imeni Timiriazeva", M. Popova, conducted in the sovkhoz an experiment by dusting beet seeds with hexachloran dust (320 g of dust per 16 kg of seeds) on an area of 2 ha; as a result of this, additional yield of green mass and of roots up to 25% was obtained. To protect the onions of Allium L. Atroviolaceum Boiss. variety from onion maggot, onion seeds were dusted with 6% DDT in a norm of 10% of dust to the weight of seeds; we moistened the onion sets slightly with water before planting and dusted them with the same dust (10 kg per 1 t of onion sets).

The Institute of Vegetable Economy has offered to disinfect onion sets with the preparation NIUIF-1. From the mother liquor we prepare a working solution (1:300), and immerse onion sets in it for 10 minutes.

This agent protects onions from the onion maggot and decreases infections by Botrytis allii. In recent years in the sovkhoz, as a result of these measures, there was no damage done to onions and onion sets by the onion maggot.

The crucifers are the crops which are damaged by pests the most in open ground; they are yearly infested by crucifers' flea beetles, by cabbage and turnip maggots, cabbage caterpillars, imported cabbage worms, diamond back moths, cabbage cutworm moths, as well as by cabbage aphids. During certain years there also appear other pests (in 1946-1951--Phytometra gamma L., in 1947-- the stem borers).

In order to control the crucifers' flea beetles and cabbage

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

maggots we dust the cabbage seedlings before planting into open ground. Early cabbage, variety Nomer pervyi, and cauliflower we dust by a mixture of 6% DDT with 12% hexachloran. Dusting is done simultaneously with the preparation of seedlings for moving them from hotbeds. One workwoman can dust in one day 50-60 thousand seedlings. 250 g of dust are required for treatment of 1000 seedlings grown in pots; whereas only 100-150 g are needed for those grown without pots. Many years of observation showed that this measure protects well the seedlings from damage by larvae of cabbage maggot, as well as from flea beetles. This measure is also profitable because it does not require either extra help or a large outlay of the chemical. Whereas placing poison-chemical by hand under each cabbage plant, already planted in the field, there is a need of four workmen per each hectare, with an expenditure of 15-20 kg of dust.

During the period of mass flight of cabbage maggot (third decade in May--beginning of June) we conduct an additional prophylactic dusting with DDT, or a mixture of DDT and hexachloran dusts, of the edges of fields occupied by crucifers.

The caterpillars of butterflies of diamond back moths, of cabbage butterfly and of cutworm moth appear in our fields beginning with the second half of June-July, and caterpillars of diamond back moths sometimes even earlier--during the first half of June. We usually have butterfly caterpillars in two generations and the greatest damage is done during the second half of June, in July and August; during a warm, sunny autumn in September, too.

During the last two years the plantings of early cabbage, variety

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Momer pervyi (Begin p. 39) and of cauliflower are usually dusted 2 times, and the medium-late varieties 3-5 times. Diamond back moths appear at the end of June and do their damage during the whole period of vegetation. For the control of this pest on plantings of early cabbage varieties and of radishes, we dust with 5% DDT and spray with anabasine-sulfate and soap (50 g of the preparation and 30-50 g of soap to a pail of water) and on medium-late varieties with a mixture of DDT and hexachloran dusts, or with hexachloran alone. At the end of vegetation (second half of August-September) for a surface treatment of plantings we utilize in most cases 7% anabadust with a filler of air-slaked lime and an addition of 10-15% of tobacco dust.

DDT and hexachloran dusts produce on insects an intestinal-contact action, which lasts for a period of 10-12 days. This makes it possible to apply them in advance and use them against two or more types of pests, which considerably decreases the outlay of chemicals.

To obtain a high effectiveness it is necessary to apply the chemical method against caterpillars and larvae of younger age, before they spread out over the plantings. The best way is to conduct the treatment during the mass emergence of caterpillars from eggs at an early phase of the plants' development. After the formation of cabbage heads, especially of the early varieties of cabbage, the use of the chemical method must be strictly limited on account of harmfulness of chemicals and a possibility of their influence on the tasting qualities of vegetables. During this time it is recommended to use 5-7% anabadust or 0.05% NIUIF-100, which affect both the eggs and young caterpillars.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

In recent years in Moscow oblast' the beet plantings were severely damaged by beet flea beetles and spinach leaf miners. For the control of these pests we used 6% DDT during the sprouting period and during the mass flight of the spinach leaf miner, about the second half of June. One should remember that the second generation of the spinach leaf miner can also be harmful, and for that reason during the second half of July it is necessary to conduct a third treatment with 7% anabadust.

For protection from onion maggot, besides the prophylactic treatment of seeds, we conduct in June a yearly, double dusting of onions (which are set out for obtaining bulb onions) with a mixture of 6% DDT and 12% hexachloran (30-40 kg per ha). Thanks to high agrotechnics and timely control of pests, the sovkhos obtained last year a record yield of onions, of Kuba variety. With a sowing of 15 kg of seeds per hectare, we harvested 35 t of big, valuable onions per hectare; on one square meter we counted from 6 to 8 kg of onions. There was no damage from onion maggots.

The last two years, in their meteorological conditions, were exceptionally unfavorable for the cultivation of cucumbers. In 1954 we obtained a yield of cucumbers of 8-10 t per ha, whereas we expected to have 16 t, and in 1955 there was still less. A mass appearance of collembola was detected in Liublino section during the period of sprouting, and during the phase of blooming appeared Doralis frangulae Kalt. For control of collembola we conducted dusting of sprouts with 6% DDT, while for the control of Doralis frangulae Kalt we sprayed with 0.05% thiophos (NIUIF-100) with an addition of 10 g of anabasine-sulfate for

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

each pail of water.

Thanks to the measures taken for the control of pests, the Liublino section harvested the highest yield of cucumbers in the sovkhoz.

All the crops, in 1955, on 555.6 ha were treated against pests by a method of dusting in a multiple of about 3.3 times. In 1956, according to a plan, it was scheduled to do the dusting on an area of 590 ha in a multiple of about 2.6 times, and a double spraying of 200 ha. In order to check the influence of chemicals on the quality of vegetables, we delivered in 1951-1953 samples of vegetables, including cabbage, from different brigades to the Government Sanitary Institute in the name of Erisman. Analyses have shown that when treating cabbage early with hexachloran (1.5-2 months before harvesting) and with an outlay of 20 to 40 kg of dust per ha (Begin p. 40) the quality of vegetables was not impared. Cabbage, which was dusted with hexachloran from 2 to 4 times (50-70 kg per ha) three weeks to a month before harvesting, acquires an unpleasant aftertaste. That is why during the late periods it is necessary to treat plantings by other chemicals (5-7% anabadust, fluosiliscate of sodium, 50% concentration of NIUIF-100).

When working with chemicals the workmen wear laboratory coats, and protect their nose and mouth with gauze bandages, which have cotton paddings. These elementary precautions lighten the work with chemicals very considerably.

Effectiveness of measures for the control of vegetable crop pests depends much on the timely and swift treatment of plantings. These two basic principles are accomplished by us with the aid of mechanization.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Since 1955 we use widely the tractor-trailer duster OKS-5 and a tractor mounted combined sprayer-duster ONK.

The sprayer OKS-5 can conduct an edge treatment of 50-60 ha of plantings in 4 hours. The sprayer-duster ONK treats up to 30 ha in 4-5 hrs. For the control of aphids on cucumber plantings in open ground, as well as for treatment of hothouses and hotbeds, we remodeled an ONK; we provided it with two oxygen hoses, up to 30 m long each; the boom sprayers we took from an "Avtomaks" [a hand sprayer]. In this way we successfully used the tractor-sprayer in open field, and in the covered ground; it was much handier than the presently used "elektrokraskopul'ty" [electricpaintstands or electricpaintcontrol panels] and the "Pomona" [a horse-drawn sprayer].

Taking into consideration defects in organization of last year's work, we decided in the current year to organize a special tractor--field brigade for the protection of plants, consisting of 5 men.

A systematic control of diseases and pests of vegetable plants is an important link in a complex of measures for a sharp raising of quality of vegetable gardening.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-742
(In full)
bn/M

A
742

Sokolov, A. V. (Reviewer)

T. D. Lysenko. Pochvennoye pitanie rastenii-korennoi vopros nauki zemledeliia. M. Sel'khozgiz, 1955, str. 121.

[T. D. Lysenko. Soil feeding of plants--the basic problem of Agricultural Science. M. Sel'khozgiz, 1955, p. 121.]

Pochvovedenie, no. 11, pp. 100-103, Nov. 1955. 67.8 P34

(In Russian)

The book of T. D. Lysenko consists of articles and reports on problems of utilization of fertilizers and feeding of plants for a period from 1953 to 1955.

In recent years T. D. Lysenko's views concerning problems of plant feeding and utilization of fertilizers underwent substantial changes.

At the beginning T. D. Lysenko spoke in support of utilization of industrial granulated superphosphate, after this he was for organo-mineral granules, later on for organo-mineral combinations, and at one time for high and then low doses of lime. All these declarations were accompanied by ascertions about high effectiveness of methods recommended by him at the given moment. At the same time, T. D. Lysenko made attempts to create his original "theory" about root ("soil") feeding of plants. In his former appearances T. D. Lysenko remarked about the lagging of science in plant feeding and utilization of fertilizers. As this last one is represented by agrochemistry, one could understand that his addresses were directed against this science.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Yet in his last reports, printed in this book, T. D. Lysenko repeatedly underscores the fruitfulness of agrochemical researches and the necessity of their further development, and accepts the definition of agrochemistry as it was given by D. N. Prianishnikov.

Plant feeding, in T. D. Lysenko's opinion, is a biological process: "but every biological process is realized by means of chemical reactions of a substance and physical, mechanical movements, occuring according to chemical and physical laws. That is why it is not possible to separate studies of biological processes from chemical transformations and physical movements. Yet the biological processes cannot be thrown together with chemical and physical." (Page 196).

Notwithstanding these considerations and the recognition of all the importance of studying the chemical processes, which are occuring in the soil and in plants, T. D. Lysenko in the works, which are published in this book, as we shall see later, does not sufficiently take into account their importance and does not utilize the elemental methods of agrochemical analysis and methods for conducting the experiments. As it is known T. D. Lysenko has stated in print that "plants are fed exclusively by the products of the microflora's vital activity." And what is more, against all that which was ascertained for more than a hundred years in exact experiments, T. D. Lysenko has maintained, that: "All the fertilizers which we introduce into the soil, even in an assimilable form, are nevertheless first of all taken up by microflora, and then the products of microflora's vital activity feed our agricultural plants." ("Izvestiia", 1946, no. 66) At the present time

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

T. D. Lysenko admits the possibility of plants feeding directly through the root systems on the mineral compounds of the soil; "wild and cultivated plants draw from the soil the same water-soluble compounds of the chemical elements", writes now T. D. Lysenko, "independently from the source of their origin, that is regardless of the fact if they are formed from compounds of chemical elements of soil and atmosphere, or during the process of mineralization of organic substances, or if they are introduced into the soil in a form of industrial water-soluble fertilizers" (page 100).

From the agrobiological "theory" of plant feeding there remained an exaggerated notion about specificity of microorganisms in the soil rhizosphere of individual forms of plants and a discourse about an idea that the introduction of fertilizers must primarily help in the development of useful microorganisms in the soil. Unfortunately, all this is told in a general form, without pointing out which processes and microorganisms exactly were meant.

It was only about the matter of the compost (1.5-2 t), which went into the composition of one of the recommended, by him, organic-mineral mixtures, and which helps in the development of useful microorganisms which feed the plants, that T. D. Lysenko stated some specific reasons. Let us cite them in detail, because they are the scientific basis for utilization of the organic-mineral mixture which is, at the moment, being recommended by T. D. Lysenko.

"Let us remember, that in the introduced 1.5-2 t of organic matter (humus) two thirds (about 70% of weight) were water. Consequently, there was introduced only 5-7 centners of air-dried organic substance. In the introduced humus there is cellulose, as well as a

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

small amount of phosphorus compounds, which can be assimilated by cellulose bacteria, also nitrogen and other substances needed by them. Under these conditions the cellulose bacteria start their vital activity, and the result is that in the soil appear monosaccharides and other water-soluble carbohydrates. In the presence of water-soluble carbohydrates, as well as of phosphorus, calcium and other elements the nitrogen-fixing bacteria start their vital activity. As a result of this in the soil the gaseous nitrogen will be fixed into ammonia, which will be transformed into various ammonium salts, nitrates and other forms of fixed nitrogen. The fixed forms of nitrogen become available not only to the microorganisms, but to the root system of plants also.

Consequently, nitrogen hunger of plants in this case also diminishes and in other cases plants can even be fully satisfied in nitrogen food; and the initial source of nitrogen in this food will be the gaseous nitrogen." (p.110.)

In another place, having stated this same theory of action of the organic-mineral mixture (Begin p. 101) T. D. Lysenko writes: "Creating in the soil suitable conditions for the vital activity of microflora, we then, figuratively speaking, are as though transforming cellulose (straw) into nitrogen food for plants. When I look on wheat, which is thus fertilized, it looks as if it were fertilized by mineral nitrogen fertilizers." (p. 57.)

But is it possible in this way at the expense of cellulose, which is found in two tons of compost, to give to the plants with the aid of azotobacter even 1 kg of nitrogen? Approximate calculations

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

show that azotobacter uses 1 gram of carbohydrate for fixing 7 to 10 milligrams of nitrogen; consequently, in order to obtain 1 kg of fixed nitrogen it is necessary to expend 100 kg of monosaccharides and other water-soluble carbohydrates.

In the dry substance of manure there is about 30-36% of cellulose; compost differs from manure in that, as a result of decomposition, the contents of cellulose are several times less in humus, than in manure. It is in no way possible that 100 kg of monosaccharides and other water-soluble carbohydrates, which could be utilized for feeding azotobacter, can be accumulated in the soil at the expense of decomposition of cellulose, which is present in the dry substance of compost introduced into the soil. Therefore, even if azotobacter can utilize the carbohydrates, which are being formed during cellulose's decomposition, the amount of cellulose in humus can hardly guarantee obtaining of even 1 kg of nitrogen.

The fact that wheat looked very good, as if it were fertilized with mineral nitrogen is quite understandable, since in Gorkakh-Leninskikh, wheat in reality is fertilized not only with an organic-mineral mixture, but also with large doses of mineral nitrogen (1-2 c of ammonium nitrate) and also with potassium (1 c of potassium chloride).[1]

[1] P. K. Kalistratov. Zemledelie, no. 7, 1955, p. 55-56.

That is why the experiments, conducted in Gorkakh-Leninskikh cannot give a correct idea on how the organic-mineral mixtures will act under production conditions, when the grain crops will not get any mineral nitrogen and potassium. It is inadmissible to explain the obtaining of high yields in Gorkakh-Leninskikh by the action of organo-mineral mixture

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

alone, and to forget nitrogen-potassium fertilizers with an addition of mixture containing superphosphate.

If T. D. Lysenko truly would admit the significance of agrochemical research, as he is now ascertaining, then, before stating such opinions, he ought to have analyzed the composition of humus and of organic-mineral mixtures for cellulose and nitrogen, determined the amount of monosaccharides, which are formed during decomposition of cellulose in humus, become interested in the expenditure of carbohydrates during fixation of nitrogen by microbes--in other words, try to introduce a factual foundation of chemical analysis and of biochemical processes under the general considerations.

An assumption about the specificity of microorganisms, which develop on roots of individual forms of plants, can be proved, in T. D. Lysenko's own acknowledgement, only be means of suppositions, which require a support of factual materials. Let us quote these considerations: "It would seem one of the two; either it is fiction, that a specific species of soil organisms is peculiar to each form of plants, or the plants do not feed through the medium of soil microflora. The answer to these questions is found in a new representation of species transformation.

Up to the present time many facts have been assembled showing the possibility of transformation of one species of plants into another. The main strength of these facts is that anyone who wants can find them yearly anew. One should only know where to look for them and under which conditions are these transformations occuring. In microbiology also are known many cases of transformation of one type of

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

microbe into another one.

If in a field appear roots of plants, which we sowed, and if there are no microbes which are specific for these plants, but there are some others then, under the influence of substances discharged by the roots, microbes non-specific to the roots of the given plant are transformed into the specific." (p. 57.)

Further on it is pointed out, that for the grains this process proceeds faster, for legumes slower. And yet on a blue lupine which was planted, without being inoculated by nitragin, into a soil which did not have any of its tubercle bacteria, already at the end of August there appeared on the roots large tubercles. "It is hard to suppose," T. D. Lysenko writes about this, "that the tubercle bacteria were brought in from outside. Undoubtedly, they are newly formed." (p. 58.) Such "assumptions" require factual proof and they cannot be trusted before its appearance. Consequently, this assumed doctrine about plant feeding by T. D. Lysenko is not scientifically based.

I am not going to dwell on separate mistakes, found in the book on problems of utilization of fertilizers or plant feeding, such as: feeding plants with "oxides" alone (p. 100), about the sameness of food, required by various plants (101), about fertilizing millet and corn in southeast by phosphorite meal (p. 68), --all this is inadmissible even for a non-specialist in problems of fertilizing and feeding of plants.

T. D. Lysenko's suggestions about utilization of fertilizers in a form of organic-mineral mixture recommended by him were already critically reviewed in print in some detail[2], results of checked experi-

---

[2] A. G. Shestakov and others. Izvestia TSKhA no. 1, 1955, F. V. Turchin, Pochvovedenie, no. 6, 1954.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

ments, which did not confirm his assumptions, were also (Begin p. 102) published [1]. Therefore I shall only dwell on the value of the new

[1] P. G. Maidin, Pochvovedenie, no. 10, 1955.

experimental material, which is offered by T. D. Lysenko in defense of his assumptions.

Results of experiments, conducted in Gorkakh-Leninskikh, and some experiments in kolkhozes are utilized to prove the beneficial action of organic-mineral mixtures in T. D. Lysenko's book. About the quality of kolkhozes' experiments, utilized by T. D. Lysenko, one can judge from incredible results of experiments in Arzamasskoi oblast' where introduction of 2 t of manure with an addition of 5 c of dolomite meal (consisting of carbonate of magnesium and calcium carbonate) doubled the yields and gave added yield up to 14 c (p. 76-77). Everyone, who used manure as fertilizer even once, knows that 2 t of manure (even though with a powdering of dolomite meal) do not give such increases. The increases of yields of grain in Arzamasski experiments from introduction of 2 t of manure were: 11.5 c, 5 c, 7 c and 14.5 c, that is on the average 9 c of grain per ha. In 2 tons of manure are contained 2-3 kg each of assimilable nitrogen, phosphorus and potassium; in the shown increase of yield, obtained from introduction of these 2 t, there should be contained 10 times more of nitrogen, phosphorus and potassium. Such increases in yields, as have shown innumerable Soviet and foreign experiments, truly occur, but from an introduction of not 2 but of 20-40 t of manure. The law of conservation of matter spreads also to plant feeding. It was spoken earlier about the attempts to

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

explain such experimental data with the aid of microbiological processes activated in the soil.

To our regret, all is not well with the experiments conducted in Gorkakh-Leninskikh. It is possible to judge about their quality from data given in table 2 (on page 116), where an account is given of results obtained from three experiments; in two of these, organic-mineral mixtures did not produce any good. In that experiment where they produced a stronger activity, yields of control sections fluctuated from 4.9 c of grain to 16.2 c, the basic deviation for them achieved was ±3.67 c of grain. Even if one excludes sections with yields of 4.9 c, then too one could not obtain from these figures any reliable data about the fertilizers' activities, because the experiments were conducted without replication for fertilized sections. The author summarizes data for differently fertilized variants of the experiment, but this, of course, is not a way out of the situation, but rather an admission of inadequacy to give a reply to the posed questions by experiments, which were conducted in Gorkakh-Leninskikh.

There is no new experimental material given in the book which could be taken as satisfactory to the elemental rules of experimental work.

One of the basic advantages of the system recommended by T. D. Lysenko is said to be a reduction in expenditure of organic fertilizers and of lime.

Let us cite below the opinion of T. D. Lysenko himself about the described expenditure of lime and manure when introducing his system of fertilizing.

T. D. Lysenko supposes that with a wide utilization of organic-mineral

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

mixture already in 2-3 years not less than 9-10 mln tons of lime materials will be introduced.

"Let me remind," writes T. D. Lysenko, "that in our whole country, prior to 1954, yearly into the fields were introduced but several hundreds of tons of lime, at a norm of 3-6 t per ha. In other words, with the new method of utilization of lime in combination with organic fertilizers at doses of lime per hectare ten times smaller, it will be utilized in non-chernozem zone then times more, than it was expended with high doses. Together with this, the general amount of manure and peat should be increases 2-3 times.

In non-chernozem zone it is necessary yearly to fertilize all the fields for all the crops, but the methods of fertilizing and fertilizers themselves should be such, that will not require a large expenditure of power and money." (p. 78.)

If one should follow T. D. Lysenko's recommendations and introduce 3 c of lime yearly to all the fields and for all the crops, then its expenditure will be many times more than in liming only those acid soils which need it in a normal dose of 2-3 t of lime. Introduction of 2 t of compost yearly into every field would require a much larger amount of manure, than when introducing the normal dose of manure 1-2 times during a crop rotation. Concerning the expenditure of the mineral fertilizer superphosphate, it is known that its introduction in small doses into the rows is much more effective and economical, than its use in the composition of organic-mineral mixtures. This is well seen from data of an experiment in Gorkakh-Leninskikh, which was conducted by A. A. Avakian (p. 17) where an increase from introduction of super-

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

phosphate in the composition of an organic-mineral mixture was only 1.4 c of grain per 3 c of superphosphate, whereas during a separate introduction of superphosphate the increase from it was equal to 4.2 c of grain. That is why such a utilization of superphosphate, as is recommended by T. D. Lysenko, is by far not the best method of its utilization; a much greater effect from superphosphate can be obtained with other methods of its introduction and, in particular, when introducing small doses of superphosphate into the rows during planting.

From a book by T. D. Lysenko the reader had a right to expect exact experimental data, confirming his original ideas and the so persistently recommended methods to the producers. Unfortunately there are no such data in the book. More than that, the publishing of the book has confirmed that the experimental work in Gorkakh-Leninskikh is done on a low order level, and the "theoretical" ideas, lying at the base of T. D. Lysenko's practical recommendations are not founded on experimental data.

A. V. Sokolov.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-743
(In part)
bh/A

A 743

Chigarev, G. A.

O khimicheskom metode bor'by s kolorodskim zhukom (Leptinotarsa decemlineata Say).

[Chemical method for control of the Colorado beetle (Leptinotarsa decemlineata Say).]

In Mezhduvedomstvennaia Metodicheskaia Komissiia po Koloradskomu Zhuku. Koloradskii zhuk i mery bor'by s nim, p. 75-93. Moskva, Akademiia Nauk SSSR, 1955.
427 M572

(In Russian)

Our work on surface means for control of the Colorado beetle, conducted in 1950, aimed at evaluating first those media of native production which had been approved earlier by world practice as effective means in the control of the Colorado beetle. In addition, we endeavored to find effective means among the new ones synthesized in our country or among those not as yet tested as applicable to this pest. An appropriate collection of preparations was submitted for laboratory evaluation as to their toxicity for an adult beetle and larvae of the 4th age group, and field evaluation as to phytocidal action exerted on potatoes (this evaluation was made of a portion of these preparations).

The collection included the following preparations. (p. 83.)

Of pulverized factory made media:

6 specimens of calcium arsenate (2 tri-substitution products with 40.2% and 43.0% As_2O_5 and 4 tetra-substitution with 51.1%, 54.2%, 55.2%

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

and 87.0% As_2O_5);

1 specimen of basic copper arsenate with 30.2% As_2O_5 and 41.3% CuO;

1 specimen of manganese arsenate with 25.6% As_2O_5;

2 specimens of sodium fluosilicate of various manufactures;

1 specimen of barium fluosilicate;

2 specimens of cryolite manufactured by different factories;

1 specimen of DDT dust with 5.6% p,p^1-form;

2 specimens of GKHTSG [hexachlorocyclohexane] dust;

1 specimen of NIUIF-100 [Scientific Institute of Fertilizers and Insectifungicides].

Of dusts prepared locally:

2% NIUIF-100;

5% anabasine-sulfate;

5% preparation No. 47 VIZR [All-Union Institute for Plant Protection];

2% " No. 117 VIZR;

2% and 10% rhodananiline [rodananilin] [tr. note: rodan, monovalent radical, --scn. (see thiocyanate)]

2% and 10% ethyl ether of monorhodan acetic acid;

10% ethylene-di-rhodanide;

20% forbiate;

30% calcium arsenate;

5%, 7.5% and 10% DDT;

0.5%, 1%, 2% and 2.5% pyrophos.

Of liquid media:

0.5 and 1% concentration emulsion from oil concentrate containing 20% DDT of a 1949 manufacture;

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

1% and 2% concentration suspension from a concentrate of a 1950 45.5% DDT manufacture;

0.12% and 0.25%, 0.5%- and 1.0% concentrate emulsion of NIUIF-100 from a concentrate containing 40% poison;

1.0% concentrate emulsion of chloroethane and a concentrate containing 20% poison;

0.5% and 1.0% concentrate emulsion of hexaethane (ethyl benzene) from a concentrate containing a 20% poison;

0.5% and 1.0% concentrate emulsion of GKHTSG containing a 20% amount of isomers of a 1949 manufacture;

0.5% and 1.0% concentrate emulsion of GKHTSG containing 20% amount of isomers of a 1950 manufacture;

0.06%, 0.11%, 0.12% and 0.22% concentrate emulsion of pyrophos with a content of it in a 25.0% and 37.5% concentrate.

In testing the dusts, the German "Gesarol staub" [gesarol dust] and E-838 preparations were used as standards; in testing liquid means--a 0.5% suspension of German calcium arsenate "Sprits-arkal" was used.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 6.

Toxicity of insecticides as it affects the Colorado beetle

PREPARATION	Content of active element in preparation in %	Percentage of mortality		
		After 7 days		30 days
		Imago*	Larvae	Imago
I. DUSTS				
Preparation No. 47 VIZR	5	0	--	--
Porbiate	20	0	--	--
Anabasine-sulfate	5	0	--	--
Preparation No. 117 VIZR	2	5	--	--
Ethyl ether of monorhodan acetic acid	5	5	--	--
Cryolite VIAM [All-Union Scientific-Research Institute of Aviation Materials]	--	5	--	--
Rhodamaniline	10	10	--	--
Cryolite from the Polevsk factory	--	10	60	--
NIUIF-100, 1949 manufacture	1	15	--	--
Ethylene-di-rhodanide	10	20	--	--
Sodium fluosilicate of the Voskresensk factory	--	30	90	--
NIUIF-100	5	40	--	--
DDT	5.5	55	75	75
Gesarol, German	--	35	85	60
Sodium fluosilicate of the Novskii factory	--	55	80	--
Barium fluosilicate	--	57	60	--
Basic copper arsenate	50.2	60	60	--

[* Insect in final, sexually mature stage.]

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 6 (con't. from page 4)

Toxicity of insecticides as it affects the Colorado beetle

PREPARATION	content of active element in preparation in %	Percentage of mortality		
		After 7 days		30 days
		Imago*	larvae	Imago
Tetracalcium arsenate of NIUIF, 1948 manufacture	31.1	60	75	--
Tetracalcium arsenate of NIUIF, 1949 manufacture	57.0	80	--	--
K-838	--	85	95	--
Tricalcium arsenate of the Shchelkovsk factory	40.2	85	70	--
Tetracalcium arsenate	54.2	87	90	--
GKHTSO with a 23% gamma-isomer	4	87	--	100
Pyrophos	2	89	100	--
Tricalcium arsenate	43.0	90	80	--
Tetracalcium arsenate	36.2	96	100	--
GKHTSO with a 12% gamma-isomer	12	95	100	100
Pyrophos	2.5	100	100	--
Manganese arsenate	25.6	95	90	--
II. LIQUID AGENTS				
20% DDT emulsion of NIUIF, 1949 manufacture	0.1	10	--	--
20% ~~Chlorten~~ Chloroethane emulsion	0.2	10	--	--

[* Insect in final, sexually mature stage.]

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 6 (con't. from page 5)

Toxicity of insecticides as it affects the Colorado beetle

PREPARATION	content of active element in preparation in %	Percentage of mortality		
		After 7 days		30 days
		Imago*	Larvae	Imago
20% DDT emulsion of NIUIF, 1949 manufacture	0.2	20	--	--
20% Hexaton [Hexaethane Ethyl benzene] emulsion	0.1	20	--	--
20% GKHTSG emulsion with 20% gamma-isomer of 1949 manufacture	0.1	25	--	--
40% emulsion of NIUIF-100	0.1	30	--	--
45% DDT suspension	0.45	40	--	--
20% emulsion of GKH TSG with 20% gamma-isomer of 1949 manufacture	0.2	60	--	--
Suspension of Spritz-arkal	0.5	66	--	--
40% emulsion of NIUIF-100	0.2	70	--	--
25% " of pyrophos	0.05	70	90	--
40% " of NIUIF-100	0.4	80	--	--
20% " of Hexaethane [Hexaethane]	0.2	80	--	--
20% " of GKHTSG 20% gamma-isomer of 1950 manufacture	0.1	90	--	--
37.5% emulsion of pyrophos	0.06	90	100	--
5% suspension of DDT	0.86	100	--	--
0% emulsion of GKHTSG with 20% gamma-isomer of 1950 manufacture	0.2	100	--	--
25% emulsion of pyrophos	0.06	100	100	--
37.5% emulsion of pyrophos	0.11	100	100	--

[* Insect in final, sexually mature stage.]

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

[CONCLUSIONS p. 91]

The following conclusions may be drawn from the data cited:

1. Application of GKHTSG preparations to the surface soil layer at the rate of 27 kg/ha (by gamma-isomer) ensures beetle destruction close to 100% in the course of the first 15 days, if the beetles have come in contact with the treated surface of the soil for about 24 hours.

2. At the end of 1 month the effectiveness decreases somewhat, but if the contact has lasted 1 day then the effect still remains high (70-80%); if the contact has lasted about 1 hour, then effectiveness is slight (5-10%).

3. The effect produced by various GKHTSG preparations is almost alike.

4. Moistening the soil surface increases the disinfecting action of GKHTSG when applied by the method indicated.

Experiment 2. October 10. In a truck-garden the test plots comprising an area of 15 m^2 are treated with GKHTSG by strewing the preparation over the soil surface which first has been mixed with a dichloroethane solution of GKHTSG. After the treatment, the places where the soil was strewn are raked over. GKHTSG is applied at the rate of 2.5; 5.0; 10.0; 20.0 and 40.0 kg/ha by gamma-isomer. Twice beetles were put under the netted breeding places arranged on the test plots (October 14 at a soil surface temperature of +15°C and November 31 at a temperature of +7°). The data of this experiment are cited in table 8.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 8.

Effectiveness of various doses of GKHTSG

when applied to soil durface at low temperatures.

Duration from GKHTSG application to placement of beetles in breeder in days	Duration of beetle contact with soil in hours	Interval of days when beetle mortality was counted	Temperature of soil surface in degrees	GKHTSH dosages in kg/ha	Beetle mortality in %
4	2	20	15	2.6	0
				40.0	60
25	27	20	7	2.6	10
				6.0	60
				10.0	60
				20.0	65
				40.0	90

Table 8 shows that at a 2-hour contact, at a temperature of 15° C, a minimum rate of application of 2.6 kg/ha is completely ineffective, while the rate of 40.4 kg/ha produces 60% of bettle destruction. At a 27-hour contact and 7° of temperature, destruction of beetles occurred at all rates of application 25 days after GKHTSG had been applied, and the higher the rate of application, the greater the destruction. Doses from 6 kg/ha and above deserve practical consideration. Disinfection of soil surface by applying GKHTSG is feasible and effective at 7--15° temperatures, i.e. at those temperatures which occur on the soil surface in early spring.

Experiment 3. November 15. Under laboratory conditions, GKHTSG dust was applied at the rate of 2.6; 10.0 and 40.0 kg/ha by gamma-isomer to soil surface in boxes comprising an area of 1 m^2 and 15 cm in height,

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

filled with truck-garden soil at a 15° temperature which subsequently was raked over. [Begin p. 92] Following the application of GKHTSG to the surface of the soil, 50 beetles were placed under the netted breeding places in each variation. After 44 hours the beetles in each variation were gathered separately by 0-5 cm and 5-15 cm horizons. When the beetles were inspected 5 days later, some of them were paralyzed or dead, but the number of those paralyzed and dead varied sharply in the upper and lower horizons.

GKHTSG doses in kg/ha	Horizon from which beetles were removed in cm	Number of beetles and their condition 5 days later		
		Living	Paralyzed	Dead
2.5	0--5	12	5	1
22.5	5--15	33	0	0
10.0	0--5	0	8	6
10.0	5--15	33	1	0
40.0	0--5	0	3	14
40.0	5--15	29	2	0

At the same time, the figures cited show that beetles introduced into surface soil treated with GKHTSG, which move to the lower layers to hibernate, succeed in passing through the upper primed layer without suffering notably from the action of GKHTSG. In contrast, GKHTSG doses applied at the rate of 10 and 40 kg)/ ha exert highly effective action upon beetles which remain in the upper horizon.

On the basis of preliminary experimental checking of the method for surface soil disinfection with GKHTSG preparations in the control of the Colorado beetle which inhabits the soil in the spring, one can draw the following conclusions:

1. By applying GKHTSG preparations to surface soil and then

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

raking it, and by subsequent contact of the Colorado beetle with that soil, it is possible to obtain a high rate, up to 100%, of its destruction.

2. The application rates of GKHTSG which produce an effect that is interesting from a practical viewpoint lie within the limits of 5-40 kg/ha converted to gamma-isomers.

3. The form of the preparation - solution, emulsion, dust - is of no essential importance.

4. Duration of beetle contact with soil treated with GKHTSG which insures a high effect is established at approximately 24 hours.

5. The exterminating action of surface soil treated with GKHTSG decreases considerably within a month; the higher the temperature, the higher exterminating action, which increases when the soil is moistened.

On the whole, the given method, which is highly effective and less expensive than the method of soil fumigation, is worthy of attention and of further study under field conditions in spring time.

REFERENCES

Instruction for potato beetle control for 1949, Berlin.

Instruction for the eradication of infection nidi of the Colorado potato beetle. Izd. Min-va Zemled. SSSR, 1946.

Chigarev, G. A. 1951. Use of soil mulches in the control of pests which inhabit the soil. Zashchita rastenii, XIII, 5.

Beran, F. 1944. Methoden zur Pruefung von Pflanzenschutz- und Vorratsmitteln. XLI. Eine neue Methode zur Pruefung von Boden--Entseuch. Reichs-Pflanzenschutzblatt, 2, No. 5, Berlin.

Brown, A. W. A. 1951. Insect control by chemicals. New York - London.

Cannon, F. M. 1951. The Colorado potato beetle. Dept. of Agric. Canada. Science series, 92.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Feytaud, J. 1924. Sur la biologie et l'extinction des foyers du Doryphore. C. R. 47-eme Sess. assoc. franc. Avanc., Sci., Bordeaux, 1923. Paris, 551-558.

Fryer, J. C. F. 1935. Colorado beetle at Tilbury. J. Minist. Agric. XLI, 11, London.

Langenbuch, R. 1936. Die Bekaempfung des Kartoffelkaefers in Stade 1934. Mitt. Biol. Reichsanst. Land.- und Forstwirtsch., 52, Februar.

Mitchener, A. N. 1949. Chlorinated camphene, chlordane, DDT and calcium arsenate compared for control of the Colorado potato beetle. J. econ Entomol., 42, 1.

Small, T. 1947. Colorado beetle in Jersey 1939-1946. Agriculture, LIII, 10. Sitzungsbericht der Konferenz der internationalen Arbeitsgemeinschaft fuer die Bekaempfung des Kartoffelkaefers, Zuerich, 1938

[Vsesoiuznyi Institut Zashchity Rastenii]

* * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-744
(In full)
db/A

17
744

Fradkin, A.B., Korotkikh, G.I.,
Nikiforov, A.M., and others.

Novye preparaty i sposoby bor'by s vrediteliami i boleznlami v sel'skom khoziaistve.

[New preparations and methods of pest and disease control in agriculture].

In V pomoshch' agronomu, v. 1, pp. 523-534. Moskva, Gosudarstvennoe Izdatel'stvo Sel'skokhoziaistvennoy Literatury, 1954. 64 V11

(In Russian)

Conditions prevalent in large-scale socialist agriculture offer every opportunity to prevent losses of yield caused by pests and diseases. Powerful technics used on kolkhozes and sovkhozes permit the accomplishment of high level agrotechnical measures designed to prevent mass reproduction and distribution of pests and diseases.

Agriculture has at its disposal a large assortment of poisonous chemicals for the immediate extermination of pests and elimination of diseases.

An important role in the control of pests and diseases of agricultural plants belongs to the aircraft-chemical method. In our country this method has eliminated the Asian locust /Locusta migratoria/ as a mass pest, it serves to protect cereal crops from the Eurygaster bug, to control pests of sugar beets, perennial grasses and other crops. The scope of this work done by aircraft increased in 1952 by more than 5 times as compared with 1940.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Concomitantly with the above, new preparations and pest and disease control methods are being adapted to production. They include the aerosol method used in the control of warehouse pests and parasites of farm animals, the concentrated benzene hexachloride preparation applied to the soil against pests which inhabit the soil, and the organic mercury preparation - granosan - used to disinfect seed of agricultural crops against various diseases.

New, highly effective means and methods used in the control of pests and diseases of agricultural crops are described below. [Begin p. 324]

Benzene hexachloride preparation for the control of soil pests of agricultural plants. The benzene hexachloride preparation is a highly effective means in the control of many species of injurious insects. It is a gray crystalline substance with a sharp odor of mold. Benzene hexachloride affects insects as a contact poison - by touching (contact with) their bodies, as an intestinal poison - by entering the bowels together with food, and as a fumigant by penetrating the insect organism through its respiratory organs. Benzene hexachloride, in all cases, attacks the nervous system first. At first the poisoned insect has convulsions of the extremities, then comes paralysis and death.

One of the remarkable properties of benzene hexachloride is its strong toxicity for soil inhabiting pests - wireworms and larvae of May beetles.

The larvae of May beetles, as well as wireworms injure the underground parts of diverse cultural plants.

Wireworms are very noxious to field crops. Some injure newly sown seed, the roots and tillering nodes of cereals, some gnaw their way into the tubers of potatoes or into the roots of root crops, they eat the roots of sunflowers, tobacco and of many other plants. These injuries are the cause of a thin

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

crop and big losses of yield. Potato tubers and the roots of root crops which have worm holes made by wireworms are easily invaded by bacteria which cause decay of these products while in storage.

Larvae of the May, June and other beetles are the worst enemies of tree and fruit nurseries, of young windbreaks and of other tree-shrub plantings. Feeding themselves at the expense of the roots they often cause the destruction of young trees. If the soil is heavily populated by beetle larvae, they can cause complete destruction of nurseries and young tree belts before their crowns have closed.

Work conducted by scientific-research institutions has determined that cleansing the soil completely of wireworms and beetle larvae requires from 10 to 20 kg per hectare of technical benzene hexachloride. In experiments conducted by the All-Union Institute of Plant Protection, benzene hexachloride injected into the soil retained its toxicity for wireworms for no less than four years. At the same time, when applied in the doses indicated above, it exerts no action whatever /Begin p. 325/ upon useful microorganisms of the soil, particularly upon azotobacter. Benzene hexachloride is harmless also for rain worms. Concomitantly with the above it has been established that benzene hexachloride accelerated growth and increased considerably the productivity of many agricultural crops.

A concentrated preparation of benzene hexachloride with phosphorite meal has been released for application to the soil. This powder-like preparation contains 25% of benzene hexachloride and 75% of phosphorite meal.

The rate of application of such a preparation against wireworms and beetle larvae of the younger age groups is 40--50 kg per hectare, and against larvae of the older age groups 60--80 kg (in smaller amounts, the preparation

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

is applied to light sandy and sandy loam soils, and in larger amounts to heavy argillaceous soils).

In crop rotations it is recommended that this preparation be applied to fallow fields since grain crops grown on fallow are particularly heavily infested by wireworms. Besides, a fallow field will be planted to root crops and potatoes only several years after it had been disinfested, so as to prevent transmission of the benzene hexachloride odor to the yield of these crops.

Plots allocated to fruit and tree nurseries and plantings are usually kept for a year under clean fallow. If these plots become infested by beetle larvae and wireworms then this soil is also treated with benzene hexachloride.

Twenty five percent benzene hexachloride on phosphorite meal is best applied in the spring during cultivation of fallow at a depth of 10--12 cm.

To do so the preparation is sprinkled evenly over the field and the soil is turned immediately.

When working with benzene hexachloride safety measure applicable ordinarily when poisonous chemicals are handled must be observed.

Artificial fogs to destroy noxious insects and ticks. Chemical methods for the protection of plants against pests and diseases, compared to other methods, have a number of advantages, but they call for large unit consumption [udel'nyi raskhod] of chemicals in the form of powders, solutions, emulsions and suspensions. In most cases this entails a reduction in machine and apparatus performance and increases consumption of labor. For instance, [Begin p. 326] treatment of 1 hectare of a fruit bearing orchard consumes 1--2 thousand liters of water solutions of chemicals which contain but 1--2% of an active element; areas cropped to grain and technical crops consume 400-600 liters of water solutions of chemicals; dusting the young crop of

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

wheat against the Eurygaster bug over hundreds of thousands of hectares even by plane consumes up to 40 kg of DDT powder containing only 6.6% of active element; this means that for this work alone planes transport and broadcast tens of thousands of tons ballast in the form of talc, ashes etc; just as much ballast has to be handled in aircraft control of forest pests, in control of weeds for which 1--2% water solutions of chemicals are used, and so forth; for instance, the annual consumption of water in the control of sugar beet pests on Ukrainian territory measures tens and hundreds of millions of buckets.

The reason which determines the indicated shortcoming of the damp and dry chemical methods of plant protection is the technical impossibility to disinfect evenly the surface of plants and soil with present day machinery using small unit amounts of a basic active element, and this, in turn, is determined by the degree of segregation (dispersion) of the given solution or powder. For instance, to cover throughout quite evenly the whole surface (upper and lower) of leaves, branches and trunks of all trees in an orchard and the whole surface of mixed vegetation and soil with a coating of the chemical in drops 1 micron in diameter (one thousandth part of a mm) would require only 50 liters of liquid per orchard hectare, yet it actually consumes up to 2000 liters.

In the control of warehouse pests treatment with an unbroken coating of drops 1 micron in diameter over all surfaces of the floor, walls and ceilings within a kolkhoz granary of a 1000 cub. m capacity would require altogether 0.4 liters of a water solution of chemicals, yet actual consumption comprises 200 liters. In the first as well as in the second examples, the total amount of the chemicals would be entirely sufficient for the complete extermination of all noxious insects and ticks.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The relation between the effect of the chemical preparation, the distribution of the liquid on the surface and the size of the separate drops during the spraying has been established long since, and, therefore, liquid dispersion is specified in the construction of sprayers, [Begin p. 327] yet in practice this specification can be fulfilled only to a certain extent. For instance, in aircraft equipment the average drop diameter is no less than 200 microns, in tractor and automobile mounted sprayers it is no less than 100 microns, and when special (economical) nozzles [nakonechniki] are used - it is no less than 60 microns. Further breaking down of the liquid causes constructional and exploitation difficulties which hinder the adaptation of complex machines to practice.

The new aerosol method of applying liquid chemicals consists of converting liquid into a fog with the aid of special machines and instruments. The size of drops of such an artificial fog measures from units up to several tens of microns in diameter.

The advantage of using artificial fogs is comprised in the high quality of treatment of all surfaces at a sharp reduction of unit consumption of the working liquid and hence, at an increase in the technical and economical effect. The finest drops of the fog settle in an even and, in a number of cases, unbroken coat on the surface of vegetation, buildings, animals, and directly on the bodies of noxious insects and ticks, killing the latter. Wherever one drop, one millimeter in diameter, falls on the surface in conventional spraying, the aerosol method distributes a million drops 10 microns in diameter. In addition, the fine drops of the fog penetrate deep into the crown of vegetation, settle on all surfaces under different angles in the direction of the flow or the cloud of the fog, penetrate by the law of molecular

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

diffusion into grooves, fissures and cracks on walls, floors etc. By their action artificial fogs of high dispersion come close to gasing.

Among the shortcomings of the aerosol method which must be taken into consideration, if it is to be applied to practice, are: the impossibility of directing the fog cloud under natural conditions, the high rate of evaporation of chemicals in the air and on the surface, poor precipitation of very small droplets on the surface. In connection with the above the aerosol method has its own characteristics. For instance, to decrease the rate of evaporation of fine drops of the fog, liquid chemicals or solvents of these chemicals with a high boiling point are used. Usually different petroleum products are used as solvents of chemicals such as technical DDT or benzene hexachloride, they are: /Begin p. 328/ Diesel fuel, solar, green and transformer oil, kerosene and naval mazut.

To decrease the drift of the fog cloud under natural conditions, the aerosol method must be applied in the evening, during the night and in the morning hours.

To improve precipitation of the fog drops, the size of the drops is regulated in the process of producing the fog and by virtue of this the distance "of the target [boia]", the fog is directed to, i.e. precipitation of its basic mass at a previously designated distance from the source of the fog-formation, has been achieved.

The use of artificial fogs under natural conditions is much more complicated when the fog, under the influence of air currents, moves with the wind at a distance up to 1 km from the machine, without rising from the surface of the soil, enveloping the entire height of vegetation, and without going beyond the limits of the crown.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Investigations conducted in the application of artificial fogs under natural conditions expand the possibilities of practical utilization of aerosol machines in eliminating reproduction nidi of pests of agricultural plants and forests, in exterminating insects and ticks - the carriers of infectious diseases of man, animal and plant.

The use of artificial fogs is considerably more simple in enclosed structures where the action of external negative factors does not manifest itself. Hence, the aerosol method for control of storage pests and external parasites of domesticated cattle and birds is already practiced on kolkhozes and sovkhozes.

Artificial fog is produced from the concentrated solutions of technical DDT and benzene hexachloride in any mineral oil with the aid of the simplest aerosol apparatus, the so-called automobile aerosol generator (AAG) designed by the engineers V.F. Stepanov and G.I. Korotkikh.

To create fog from working liquid the energy of hot exhaust (waste) gases from an internal combustion engine is used, in the given case an automobile motor.

The operational scheme of the apparatus and its construction are very simple and consist of the following. The working liquid flows by gravity from a tank (in the body of an automobile) [Begin p. 329] into a pipe with a jet nozzle, the end of which is found in the narrowest part of a grooved covering [profilirovannaia nasadka]. Through this same fitting the combustible gases flow at a great speed from the automobile motor, to the exhaust collector to which the gas pipe of the apparatus is attached. The combustible gases segregate the liquid into fine droplets and then vaporize them in part or completely and eject them from the covering [nasadka] where the fog forms.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The mounting and exploitation of an aerosol apparatus of this type are simple, its performance is promising and, therefore, its use under kolkhoz and sovkhoz conditions encounters no difficulties, and installation of the apparatus does not interfere with the use of the automobile for transit. The mounting and dismantling of the apparatus takes 15-20 minutes. The technical operation of the apparatus in the disinfection of buildings is also simple.

The automobile drives up with its right side to the building to be treated, the end of the pipe with the attachement [nasadka] is inserted through the open door, window or ventilation hatch, the motor of the automobile is started up to a speed of 40 km per hour (1800--2000 revolutions per minute) and the discharge faucet is opened. Every aerosol apparatus has a measuring tank which indicates the amount of liquid consumed.

The aerosol apparatus of the construction described can be mounted onto the automobiles GAZ-MM and GAZ-51, and by making a simple coupling [perekhodnaia mufta] - onto any automobile (ZIS-6, GAZ-67 etc.) or tractor.

When enclosed installations are treated, the rate of fog formation by this apparatus is 0.8 liters per minute, and its performance between 20 and 80 cub. meters per minute, depending on conditions of application. In the control of warehouse pests the performance rate of the apparatus averages 50 cub. meters per minute., i.e., it takes about 10 minutes to treat a kolkhoz granery of a 500 cub. meter capacity. Thus, a machine-tractor station which has only one aerosol apparatus mounted onto an automobile can carry out chemical treatment of all kolkhoz buildings: storehouses, livestock installations, aviaries and public places (clubs, dining rooms etc.) within several days.

[Begin p. 330].

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Aerosol treatment of kolkhoz buildings is carried out by machine-tractor stations upon agreement with the kolkhozes.

In 1952, the granaries and livestock installations treated by the aerosol method on kolkhozes of the Ukrainian SSR, the Krasnodar and Stavropol Territories, the Crimean, Rostov, Moscow and other regions, had a total holding capacity of several million cubic meters. The apparatuses manufactured are delivered to Machine-Tractor-Stations, zooveterinary centers and hospitals through the local offices of Agricultural Supply [Sel'khozsnab].

The aerosol method of applying a 4% solution of technical benzene hexachloride in mineral oil at the rate of 10--20 cub. cm. per cub. meter of space ensures the extermination of granary and rice weevils [Calandra granaria and Calandra oryzae or Sitophilus granarius and Sitophilus oryza], the mealworm [Tenebrio molitor], meal moth [Pyralis farinalis], and meal and cereal mites in granaries. Application of the same solution of benzene hexachloride and a 10% solution of technical DDT in mineral oil frees livestock installations of flies, mosquitos, lice, fleas, animal lice [vlasoedy], bird lice [pukhoedy] and diverse species of ticks. In the event solar oil is used as a solvent, the aerosol method will rid livestock and birds of external parasites (after treating the animals inside of sheds, on pastures or in outdoor enclosures).

The aerosol method can be utilized also for the control of weeds of young crops, for control of falling off of ovaries [opadanie zaviazei] and fruits (growth substances), for artificial removal of cotton leaves or for drying of certain plants (seedlings of beets, maize and others) before a mechanized harvest of the yield.

Disinfection of seed with granosan. Granosan (NIUIF-2) is a new mercuric organic, universal, high grade preparation that disinfects seed of agricultural

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

crops against the causal agents of fungus and bacterial diseases. Granosan disinfects seed not only for external infections but also for internal ones (fusarium, helminthosporium, gray mold, [Botzytis anthophila] etc., that lie deep in the tissues, and it has the particularly valuable feature of boosting the germination of seed, stimulating plant development and increasing their yield.

In treating seed with granosan the method of dry disinfection is used. The seed is mixed thoroughly with the preparation for 5 minutes (cotton seed for 10 minutes) [Begin p. 331] in seed disinfecting machines or in adjusted barrels. Granosan per centner of seed is used as follows: for wheat, rye, millet and maize - 100 gr.; for oats, coriander, grass mixtures - 200 gr; for barley, flax, clover, sunflower - 150 gr; for tomatoes and cucumbers - 300 gr; for cabbage and carrots - 400 gr; for beets and soya - 400-500gr; for peanuts, perilla, castor plant and lallemantia - 100--400 gr; for cotton - 600 gr. In a simultaneous infection of wheat seed by smut and fusarium, the preparation is used at the rate of 200 gr per centner of seed.

Seed treated with granosan can be vernalized. Granosan can be applied to seed that have been treated with naphthalene, DDT or benzene hexachloride.

If azotobacterin is applied then the seed should be disinfected with granosan 30 days before seeding.

Seed disinfected with granosan can be treated also with phosphorobacterin and nitragin, but they must be seeded immediately after the treatment.

Seed can be treated with granosan directly before seeding or two-three months prior to seeding. Seed can be treated in advance only if their moisture does not exceed 15-16%. Seed with an increased moisture are disinfected no sooner than three days before seeding.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The high effectiveness of granosan against smut was demonstrated in all districts in the very first years of its adaptation. On the "Avangard" kolkhoz, Kormilov District, Omsk Region, the wheat variety Mil'turum 321 sown from seed which had been treated with granosan was attacked by stinking smut to the extent of 0.03%, yet when the seed had been treated with the AB preparation infection of the young crop was 5%.

Disinfection of seed of the Caucium 111 wheat variety on kolkhozes of the Omsk Region reduced crop infection by stinking smut to 0.02%, while in wheat sown from untreated seed stinking smut infection was 11.4%.

On kolkhozes of the Ukrainian SSR, the Tartar Autonomous SSR, the Altai Territory, the Ylianov and Chkalov Regions where granosan was used to disinfect the seed of grain crops, the crops were either free of smut or the infection percentage was negligible.

The use of granosan on kolkhozes of the Belgorod, Sazhensk and other Districts of the Belgorod Region increased the yield of wheat by 10--20%, compared to crops [Begin p. 532] from seed disinfected with the AB preparation.

In the Chitinsk Region where the yield of grain crops was reduced heavily by fusarium, it increased sharply on the kolkhozes of "Krasni pakhar'", Petrovsko-Zavodsk District, "Vostok", Barzinsk District, and in a number of kolkhozes of the Ust-Karpsk District when the seed used for sowing was disinfected with granosan.

In the Altai Territory where sunflower seed were disinfected with granosan, the percentage of plants affected by white rot decreased 8 times, sunflower germination capacity increased by 20%, and the yield by 34%.

Granosan treatment of soya seed (experiments of the All-Union Institute of Soya and Castor Plants) reduced sharply bacterium incidence of crops and

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

increased on the average 3 times the number of tubers per plant, and the yield by 21-38%.

When clover seed are treated with granosan (data of the All-Union Institute of Forage Crops) 33% more plants survive the winter than do the plants which were not treated, the weight of the raw clover mass increases from 14 to 30%, and there is a sharp decrease of gray mold.

Disinfection of seed of "elongata" flax [len-dolgunets]. The sources spreading flax diseases - fusarium, polyspora, ascochyta, anthracnose - often are seed infected by these diseases.

Granosan treatments of flax seed reduce sharply their infection and increases the density of flax stalks and the yield of long fiber by 30%.

Flax seed are treated at the rate of 150 gr of disinfectant per centner of seed. Dry treatments are carried out in special machines, "Ideal", "Urozhai" and others, or in barrels. The barrel or machine must be turned for 5 minutes at a rate of 40-50 revolutions per minute, there must be at least a total of 200 revolutions.

In 1951, 59% of flax seed was treated with granosan in the Kalinin Region. In the Beshetsk and Krasnokholmsk Districts of the same Region only granosan is used to disinfect flax seed.

General treatment of flax seed with granosan ensures a considerable increase in their seeding properties and productivity. Granosan treatments reduce sharply disease incidence of seed and of flax sprouts, it does not, however, exclude subsequent infection of the young crop. [Begin p. 333] Hence, for successful control of flax diseases it is necessary, along with granosan treatment of seed, to employ the entire system of measures creating better conditions for flax growing.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Disinfection of the seed of sugar beets. Not infrequently fungi and bacteria enter the soil with beet seed and cause the sprouts of this crop black root [kornseed] infections*. Shoots infected by black root decay, the young crop thins out which is likely to make reseeding of beets necessary.

Disinfection of beets with granosan completely destroys fungi and bacteria. Thus, if seed treated with granosan and untreated seed were placed on sterile culture media, a large amount of fungi and bacteria would develop on the untreated seed the very next day, while the disinfected seed would remain free of any microorganisms whatever when germination is in progress.

Sowing of beets from seed disinfected with granosan depresses also the activity of soil microorganisms (within the zone of germinating seed) which may also cause black root infection.

In a study of the respiration of beet seed during their germination it was established that granosan increases the activity of shoot tissues and thereby conditions their increased resistance to black root.

According to data of 39 experiments conducted by the All-Union Scientific-Research Institute for Sugar Beets, granosan treatments of beet seed reduce the infection of beets by black root by 27%; density of root plantings was higher than in crops seeded from untreated seed, and the increase in root yield due to disinfection comprised 19 centners per hectare.

At the Lgov Experimental Station, half of a field of ten hectares in area was cropped to seed treated with granosan, and the other half to untreated

---

* Tr. note: disease caused by various fungi and bacteria aided by reciprocal action of plant and environmental conditions.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

seed. In the first days of the appearance of sprouts a marked difference was observed between the crops in favor of treatments. Sprouts from treated seed were twice as dense, black root infection was 4 times less, and density of plants at the time their yield was gathered was by 16 thousand per hectare more than on the area cropped to untreated seed. [Begin p. 333]

The yield of crops from disinfected seed was 34 centners per hectare higher.

Similar differences in productivity on plots cropped to treated and untreated seed have been established on kolkhozes of the Semonovsk District, Poltava Region and in a number of kolkhozes in the Sumy and Khmel'nits Regions.

Beet seed are treated at the rate of 4 kg of granosan to 1 ton of seed. Although an increase in the granosan dose up to 5-6 kg per ton of seed did reduce black root infection of beets, it failed to increase the yield of roots.

The positive effect of granosan is marked also on the seed of beets which have been exposed to vernalization and awakening [probyzhdenie]. In experiments of the All-Union Scientific-Research Institute of Sugar Beets, of experimental stations and kolkhozes of the Vinnitsa and Poltava Regions it was observed that mold fungi developed vigorously on untreated beet seed (often causing havier development of black root) after they had been soaked in water (for vernalization or awakening).

Yet when seed treated with granosan was sown, no development of fungi was observed.

When disinfected awakened or vernalized seed was sown the sprouts were thicker, beet infection by black root decreased by 30% and productivity of roots increased by 10 centners per ha.

In vernalizing treated seed one must be guided by the rules specified in the instruction, seed must be given a good airing to prevent a drop in seed germination.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The best time to treat beet seed with granosan is 1--5 days before seeding. According to experimental data, however, advance treatment of seed (a month before seeding) produced no negative influence upon their germination or yield of roots.

Hence, under industrial conditions, it is permissible to treat the seed of beets with granosan even earlier.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-745
(Abstract)
db/M

745

Khisurian, N. A.

Podsushivanie rastenii na korniu

[Desiccation of standing plants].

Zemledelie, v. 4, no. 6, pp. 80-83, June 1956. 20 244

(In Russian)

The three-year research on defoliation of plants has shown that artificial throwing off of leaves by means of spraying with chemicals also speeds up the ripening of grains. One of the interesting phenomena is that the fast ripening seeds lose their moisture very quickly and dry up. Difference in moisture in seeds of normal plants and of defoliated ones at the moment of harvest ripeness usually is not less than 5%. Many regions in USSR harvest their grain crops with a moisture content of over 17%; they require additional drying before storage. This circumstance led to the conclusion that drying the grain crops, while yet standing in the fields, would be a simpler and a more economical method.

Desiccation, ten days before harvesting, was tried in U.S.A. with rice, barley, also clover, alfalfa, and bird's foot trefoil. In all cases a quick reduction of moisture was noted to a degree where seeds could be stored without additional drying after harvesting. Also, thanks to a more uniform and general ripening after desiccation, bigger yields of grains or seeds were obtained. Similar experiments are conducted in England, Denmark, and in other countries.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

In USSR experiments were conducted with winter and spring wheat.

Winter wheat experiment, in triple replication, was done on July 28, 1955, at the beginning of the wax stage of ripeness. Observations showed that the sprayed plants quickened their ripening by 5 days compared to the control.

Three chemicals were tried out for this experiment: calcium cyanamide (150 ml per 1 of water) and solutions of sodium chlorate and magnesium chlorate (2% concentration). Output of liquid was 400-500 ml per 10 sq. m. No difference in the speed of ripening due to any one chemical substance was noted.

Observations of dynamics of moisture show that during the first five days after spraying a daily loss in moisture by the grains was not less than 2%; during the second five days it decreased somewhat. The most intensive process of desiccation was in plants sprayed with sodium chlorate and magnesium chlorate. After 10 days the moisture in seeds of plants sprayed by them did not exceed 12%, while the normal moisture content usually is 17%. Calcium cyanamide produced a smaller effect - 14% - but even this percentage allows the grains to be stored without additional drying.

In order to check the quality of grains and the size of the harvest some analyses were made. Calcium cyanamide did not decrease the yield, while sodium chlorate did somewhat. Spraying with magnesium chlorate noticeably increased the yield. It also gave the highest absolute weight, which fact might explain the increase in yield. No physiological or biochemical tests were conducted and, thus, this increase in yield after sprayings with magnesium chlorate is not yet fully explained. One of the causes might be that with uniform ripening less grains are lost during harvesting, and again there is less waste of green seeds during winnowing.

One should also note that the artificial desiccation of standing plants

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

did not influence the height of the absolute weight of grains, and especially their germinating ability. Thus the quality of the seeds did not deteriorate.

During the experiment with spring wheat the variants were similar to the first experiment, also the replication was triple, but spraying was done at a somewhat earlier phase of ripening and thus it brought about a greater reduction in the ripening period than with winter wheat.

In 2-3 days considerable burns on leaves were seen. While in control plants ripening occured after 16 days, in sprayed ones it was after 9 days - 7 days earlier.

Dynamics of moisture were evaluated every 3 days. The loss of moisture proceeded very intensely and after 9 days the grains reached the air-dried state. In control grains moisture was twice as high. And even at harvest time, 7 days later, they still had over 16% moisture.

Data in table 6 shows that plants sprayed with magnesium chlorate brought the highest yield and had the highest absolute weight of grain. Their germinating ability was similar to that of control plants.

But it should be noted that these experiments are only of a preliminary and approximate character. The ripening of grain crops in 1955 in Moscow oblast' proceeded under high temperature conditions and in an absence of rains. Under other meteorological conditions, and especially, in wet weather results might have been different.

Repeated research on large areas and under production conditions are necessary before this method of desiccation can be recommended with certainty. Proper dates for sprayings must be worked out. Suitable chemicals must be found which would be harmless for men and animal even in those cases where straw will be used not as a feed, but as litter.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Also careful studies of physiological and biochemical processes, which proceed in the plants during artificial speeding up of their ripening and drying, are required.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-746
(In full)
db/M

Poliakov, I. M.

Novye preparaty dlia iskoreniuiushchikh opryskivanii.

[New preparations for eradication sprayings].

Doklady, Akad. Sel'sk. Nauk im. V.I. Lenina, no. 5, p.25-26, 1956 20 AKl

(In Russian)

A

746

A definite system of measures is used for the control of diseases in fruit and berry plantings. A weak spot in this system is giving insufficient attention to the initial sources of infection, which are to be found in fallen leaves and branches of plants, as well as in the soil. The fact is that harmful microorganisms (apple scab, grape mildew, antracnose and Septoria of currants, a parasitic fungus of gooseberry, and others) are transferred to the trees and bushes in spring and infect them. The primary infection occurs at different times, depending on the weather conditions. This is the reason why in the practice of control, as usual, treatments are started too late, which results in a heavy infection of plants, as well as in an unproductive expenditure of the scarce copper sulfate in the form of Bordeaux mixture for spraying.

In order to eliminate these defects a new element was offered for the system of measures, the so-called eradication sprayings. In the early spring the soil is sprayed with a solution of one or another strong disinfectant. This allows one to sharply increase the effectiveness of the utilized system of measures and decrease the number of the following cover sprayings with

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Bordeaux mixture. In the future we shall try to fully replace the Bordeaux mixture by preparations, which do not contain any copper, as, for instance, "fuklazin" or dinitrothiocyonagenbensene.

Development of necessary preparations was dictated by a great need in chemicals of this type as well as in other fields of plant protection.

Comparative laboratory experiments of a series of compounds, obtained by us jointly with the laboratory of organic chemistry of the All-Union Institute of Plant Protection (VIZR), have shown the promise of some of them. Our attention was, first of all, drawn to preparation no. 47. It is a new thiocyanogen organic compound of a native synthesis, which has fungicidal, as well as insecticidal properties. Manufacture and wide production tests of this preparation as technical, in a form of emulsion, so also of homogenized, have shown its high fungicidal properties and economic effectiveness, which was expressed in the raising of the product's high quality and in an increase of yields.

But the factory production of the cited preparation has shown some points which lower its qualities, namely, its comparitive high cost and the irritating properties during its utilization when it gets onto the skin of those working with it.

In consequence of this we proposed two new preparations - nos. 125 and 78. [Begin p. 24]

Preparation no. 125, developed by the All-Union Institute of Plant Protection together with the All-Union Institute of Shale Reprocessing, is a mixture of nitro derivative phenols which are obtained from shales. This preparation is twice as cheap as preparation no. 47 and has a tremendous base of raw materials. Besides, this, it is very soluble in water and lacks

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

those inconveniences during utilization which no. 47 has.

Phenolate of pentochlorphenol is the active element of the preparation no. 78. The promise of the cited preparation is in the fact that a half-finished product, obtained during synthesis of hexachloran, goes into its preparation. It also is cheaper than no. 47, is very soluble in water, but has, to a certain degree, irritating properties when utilized.

After a preliminary testing of the cited compounds under laboratory conditions, we conducted field experiments for their comparative evaluation in the control of grape mildew. Side by side with the cited preparations, as a standard, we also took thiocyonogen and preparation no. 47.

Results of these experiments are presented in table 1.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 1

Comparative results of preparations for eradication sprayings in the control of grape mildew.

Variant	Infection in points (%)					Average weight of grapes	
	Healthy	0.1	1	2	3	PER BUSH (kg)	of one bunch (g)
Control pure.....	17.2	25.7	37.3	18.8	3.0	1.7	75
Control economic.....	28.7	47.3	21.8	2.2	0.0	1.8	93
Preparation no. 47 and Bordeaux mixture.....	59.7	32.3	6.4	1.7	0.0	2.3	88
Preparation no. 125 and Bordeaux mixture.....	59.4	34.5	6.1	0.0	0.0	2.1	92
Preparation no. 78 and Bordeaux mixture.....	41.9	43.3	13.4	1.4	0.0	2.0	94
Preparation thiocyonogen and Bordeaux mixture.....	63.0	35.1	1.9	0.0	0.0	2.4	106
Preparation thiocyonogen; without Bordeaux mixture...	37.6	45.0	13.8	3.4	0.6	1.9	86

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

From these data it is apparent that all the proposed preparations for the eradication sprayings are quite effective in the control of grape mildew. Their utilization gives the possibility of obtaining twice as many healthy berries compared to the economic control, increasing their yield on one bush up to 50%.

Similar data were received as a result of use of some of these preparations in local organizations, particularly on the Slavianskoi base of VIZR (on grapes) and on Leningradskoi fruit - berry station (on berry patches).

Especially emphasized should be data given in table 1 on the use of thiocyonogen alone. As in technical, so also in economic effectiveness, it surpasses the control. Similar results were also obtained as a result of the use of preparation no. 125. On the basis of these data it follows that the cited preparations act not only as disinfectants, which destroy the overwintering sources of infection, but also in a way of modification of interchange and in stimulation of plants. Besides this, (Begin p. 25) use of these preparations gives a possibility of reducing the expenditure of copper by decreasing the number of cover sprayings with Bordeaux mixture or wholly substituting for it by preparations which do not contain any copper (for instance fuklasin or dinitrothiocyonogenbenzene).

For an additional test of the cited cases, preparation no. 125 is now being used by several stations. The results obtained are corroborating the cited cases under conditions of an addition of time for utilization of preparations for each specific zone. As an illustration it is possible to cite data of Slavianskoi base of VIZR (performer Iu. V. Gorbunova), shown in table 2.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 2

Influence of eradication sprayings with preparations nos. 47 and 125 on development of mildew and yield of grapes. Variety Pedro - Khimenes.

Variant			First manifestation 9/VIII		When harvesting 13/IX to 15/IX		Weight of yield from one bush (kg)	Weight of yield c/ha
			infection (%)	Development (%)	infection (%)	development (%)		
Spring spraying of soil	2% preparation no. 47	Spraying of bushes						
		1% Bordeaux mixture						
		5 sprayings.....	0:1	0:003	0:2	0.005	5.74	143.5
		Same, 4 sprayings	1:3	0:04	0:7	0.02	4.36	109.5
		" 3 "	1.8	0.05	6.0	0.2	4.18	104.5
	2% preparation no. 125	1% Bordeaux mixture						
		6 sprayings.....	0:9	0:05	1:0	0:03	5:36	134:0
		Same, 4 sprayings	1:8	0:05	3:8	0:07	5:17	129:2
		" 3 "	2.8	0.07	7.5	0.2	4.46	111.5
	1.5% preparation	1% Bordeaux mixture						
		5 sprayings.....	1:0	0:03	1:2	0:03	5:42	136:5
		Same, 4 sprayings	1.7	0.05	3.2	0.08	5.32	133.0
Without spraying the soil		1% Bordeaux mixture						
		5 sprayings.....	1:7	0:05	10:2	0:3	4:48	111:6
		Same, 4 sprayings	3:5	0:09	12:2	0:3	4:33	108:2
		" 3 "	5:1	0:2	22:0	1:2	4:11	102:7
		Control	25.2	2.1	76.0	12.4	3.49	87.2

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Analysis of data in table 2 shows, that use of eradication sprayings gives not only a high technical effect, but also increases the yield of grapes up to 30% compared to sprayings according to the old system. Besides this, the expenditure of copper sulfate can be reduced by 40%.

The prospect of utilization of preparation no. 125, in order to fully substitute in cover sprayings the Bordeaux mixture with fungicides, which do not contain any copper, and experiments show data of comparative effectiveness of various preparations for the control of grape mildew, obtained by Moldavskaia Station for Protection of Plants (table 3).

These data do not need any comments. With future production tests of fuklazin and dinitrothiocyonogenbenzene it is necessary to evaluate them according to geographical zones with the use of eradication sprays.

Data, similar to those on grapes, were obtained for a parasitic fungus on gooseberries, for Septoria and antracnose on currants. What [sentence continues on page 26 after table 3] (Begin p. 26)

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 3

Comparative effectiveness of various preparations for control of grape mildew on the background of eradicating sprayings.

Variant	Eradicating sprayings with preparation no. 125		Without eradicating sprayings	
	infection (%)	development (%)	infection (%)	development (%)
Control	13.0	3.8	20.0	6.2
1% Bordeaux mixture	0.0	0.0	2.0	0.5
2% fuklazin	0.0	0.0	6.0	2.2
2% dinitrothiocyonogenbenzene	0.0	0.0	4.5	1.12

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

concerns apple scab, preparation no. 125 is the most promising. It gives a high technical effect, but in some points it causes a small reduction of apple yields.

At present time enough materials have accumulated, which testify to the necessity of augmenting the existing system of measures for the control of diseases of fruit-berry crops with eradication sprays in northern and southern zones of the country. For this purpose one must insistently recommend the most promising preparation no. 125 for the use in vineyards and berry pathches.

For the control of apple scab it is necessary to once again conduct geographical production tests of all cited preparations and then choose from among them the most promising one.

The necessity of swiftest utilization of chemical means for control in eradicating sprayings is also dictated by the fact, that their sphere of utilization must be expanded to technical, grain-legumes and other crops. At the present time, for instance, there are reports, according to data from, the Baltic Station of Plant Protection VIZR, that a pre-planting spraying of soil with preparation no. 125 sharply reduces infection of ascochyta leaf blight of peas and increases their yields up to 30%.

All-Union Scientific-Research
Institute of Protection of
Plants.

Received in the
editorial office
16/1 1956

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-747
(Conclusion and
references)
db/A

Babaian, A.A., and Karapetian, K.A.

Tsentralizovannoe obezzaraživanie semian khlopchatnika v Armenii i ispytanie nekotorykh novykh protraviteleĭ.

[Centralized disinfection of cotton seed in Armenia and tests of some new disinfectants]

Akad. Nauk Armianskoĭ SSR., Izv., Biol. i Sel'skokhoz. Nauki, vol. 7, no. 5, pp. 15-25. May 1954 20 Er4

(In Russian)

17
747

CONCLUSION

1. Centralized disinfection of cotton seed with the NIUIF-2 (granosan) [released by Scientific Research Institute of Fertilizers and Insectifungicides] preparation, under conditions of an extensive commercial experiment, without preseeding soaking of the seed, which is practiced in Armenia, produced effective results in the control of gummosis and reduced gummosis infection of sprouts by two-three times as compared with the decentralized disinfection of seed with formalin on kolkhozes.

2. Centralized disinfection was accomplished with the PU-1 machine which to some extent is adapted to cotton seed. The machine PU-1, however, is not sufficiently improved nor efficient enough for the disinfection of seed in cotton cleaning plants; it can be used temporarily until a more improved and more powerful machine can be obtained, particularly the SP-3 built by TSNIIKHProm [Central Scientific-Research Institute of the Cotton Industry].

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

3. Comparative tests made of seed disinfected by the PU-1 machine and a barrel with dowels utilized by UkrNIKHI [Ukrainian Scientific-Research Cotton Institute] and in some industrial experiments in the cotton districts of the Ukraine showed no difference in the effectiveness against gummosis. Use of the barrel is less efficient as a result of its intermittent action.

4. Disinfection of seed with the NIUIF-2 preparation under the unfavorable conditions of spring is a better means of preserving seed germination compared with formalin; in separate experiments the difference amounts to as much as 23 percent.

5. The rate of consumption of the NIUIF-2 preparation amounts to 10 kg per ton of seed. This rate which we have established in previous experiments in Armenia is more optimal and its reduction may provoke unsatisfactory results in years of epiphytic development of gummosis.

6. Of the three dry preparations tested which contain no mercury (tetrachlorobenzoquinone 50%, tetramethylthiuramdisulfide, copper trichlorophenolate 20%), 20% copper trichlorophenolate proved most promising. This preparation possesses bactericidal properties, adhere well to seed and, thanks to its coloring, aids in checking disinfection quality.

7. The 50% tetrachlorobenzoquinone preparation possesses a high degree of bactericidal power, but it reduces badly field germination of seed. This reduction is observed under conditions less favorable for seed germination.

8. As a seed disinfectant, the tetramethylthiuramdisulfide preparation is ineffective in cotton gummosis control.

Armianskii Nauchno-Issledovatel'skii
Institute Tekhnicheskikh Kul'tur
MSKH SSSR, g. Echmiadzin

Received at editor's office
Dec. 21, 1955

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

REFERENCES

1. Babian, A.A. and Karapetian, K. A. NIUIF preparations in the control of cotton gummosis and the importance of presseeding soaking of seed at the appearance of disease. Sb. Trudov ArmNIITK, 3, 1950.

2. Vatolkina, K. Evaluation of disinfectants and methods of disinfecting cotton seed against gummosis. Zh. Khlopkovodstvo, 12, 1951.

3. Mirpulatova, N. Centralized disinfection of cotton seed. Zh. Khlopkovodstvo, 2, 1952.

4. Khokhlov, I. and Lakhtina, Z. Machine for dry disinfection of cotton seed grain against gummosis. Zh. Khlopkovodstvo, 11, 1952.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-748
(In full)
db/M

Ruzaev, K.S., and Korotkova, P.I.

Bor'ba s vrediteliami i boleznlami na vinogradnikakh.

[Control of pests and diseases in vineyards].

Sad i Ogorod, no. 3, p. 78-81, Mar. 1956. 60 Sal3

(In Russian)

A 748

Organization of protection of vineyards from diseases and pests is of paramount importance for the increase of yielding capacity.

In recent years viniculture farms and MTS (Machine Tractor Stations) are being equipped with highly-productive technical equipment, including powerful apparatuses for control of pests; and the chemical industry is increasing its output of poisonous chemicals. All this gives a possibility, with a good arrangement of work, to bring down to the minimum the harm inflicted by diseases and pests. On many farms, including sovkhozes "imeni Molotova", in Krasnodarskii region, "Suvorovskii" in Stavropol'skii region, "Rekonstructor", in Rostovskaia oblast', and kolkhoz "Pobeda", Stavropol'skii region, where protective measures are conducted systematically, losses from diseases and pests are reduced to the minimum and every year they obtain stable, high yields of grapes.

Yet there are many farms where proper attention is not given to the control of diseases and pests, and a result of this is that a considerable part of the yield is lost.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

One or another method of control should be used, depending on the mode of life of the pest and the degree of infection of the vineyard. That is why it is necessary on each farm to make observations of the development and spreading of pests and diseases, of the time of their appearance, as well as keep accounts of the utilized control. All these observations should be entered into a journal, each item separately on its map or square. Introduction of records into the practice of viniculture farms will permit one to more accurately determine the time for conducting protective measures, as well as to control their quality and effectiveness. Such an organization of control will allow more fully to protect the crop from pests and diseases, to reduce the output (Begin p. 79) of poisonous chemicals and utilize manpower more productively.

One should adhere to exact doses when spraying and dusting, and for this reason it is necessary to keep accounts of the output of poisonous chemicals and liquids for each unit of area. Sprayings should be done carefully, so that each leaf and shoot be heavily covered by minute drops of the liquid. During dusting one should strive for a uniform distribution of chemical over the whole plant.

Timely conducting of all agrotechnical measures is of great importance side by side with utilization of chemical means. Basic among them are: cleaning the vineyards of fallen leaves and after-harvest waste, fall plowing and regular cultivation of soil, seasonable tying of vines and green shoots, systematic destruction of weeds and a careful conducting of all green operations.

Mildew is the most dangerous and widely spread disease of grapes. For a dependable control of the vineyard from mildew it is very important to

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

correctly establish the dates for spraying. If at the beginning of the opening of leaves rains are falling very often, and the minimum temperature at night is above 12°, then the first spraying should be done at the appearance of 4-5 leaves on the shoots. During dry weather the first spraying should be conducted before blooming of grapes. Dates for subsequent treatments are established depending on the condition of weather and the presence of fungicide on leaves. Thus, if during the period of intense growth of shoots (May, June) rains fall often, then sprayings should be repeated every 7-8 days. With rarer and lighter rains, after which the earth dries quickly, sprayings are done 12-14 days apart; during dry weather - only after a heavy rainfall. When growth of the shoots stops (July, August) periods between treatments can be lengthened to 3 weeks.

If the Bordeaux mixture, which was applied to the leaves is washed away, then spraying should be repeated without awaiting the established date.

On irrigated vineyards treatment should be conducted before each vegetative irrigation. For establishing the remaining dates one should follow the same principle as for the non-irrigated vineyards.

The plots which are inundated by thawed waters, and also those which are situated in lowlands and ravines, where dew does not dry for a long time, should receive special attention. Here spraying must be done as often as in rainy weather.

When conducting timely and careful treatments for dependable protection of vineyards from mildew it is sufficient to use 1% Bordeaux mixture or copper oxychloride. If the disease has spread widely and rains fall often and heavily, which wash off the copper deposit from the leaves, the concentration of the Bordeaux mixture should be increased to 2%.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

In localities, where a strong development of mildew is recorded yearly, it is necessary without fail, to spray the inflorescences with 2-3% Bordeaux mixture during the period of their loosening.

In the grape nursery the sprayings are begun at the appearance of the first 2-3 leaves on the set out plants and the treatment is repeated every 8-12 days during the course of the whole vegetative period.

Vineyards are dusted with powdered sulfur in a dose of 15-30 kg per ha for the control of fungus Erisyphe oidium.

With a temperature below /15°, when dusting with sulfur is little effective, it is better to conduct a spraying with 1.5-2% colloidal sulfur or a lime-sulfur decoction (ISO) of a concentration for 0.5 to 1°, according to Baume.

In regions of constant and strong development of oidiums dusting or spraying vineyards with sulfur preparations is done 3-4 times during the summer. The first treatment is conducted soon after the opening of buds, the second during the period of blooming or soon after its ending, the third 10-14 days after the second and the fourth (if needed) three weeks before the ripening of grapes.

In regions of slight development of (Begin p. 80) oidiums, spraying is begun at the appearance of the disease; 10-14 days later the treatment is repeated.

For control of white rot vineyards are sprayed with 1-2% suspension of sulfuric-organic preparation no. 2 or a 4% Bordeaux mixture. First treatment is conducted at the appearance of first symptoms of disease, the second in 8-10 days after the first. In case of heavy development of the disease it is necessary to conduct a third treatment before the start of berries' ripening.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Canker is an extremely widespread disease of the grape vines, produced by bacteria. For control of this disease and for the prevention of its spreading it is necessary to conduct the following measures.

The cuttings for plantings should be taken only from healthy bushes.

During pruning of vineyards one should trim and then destroy all the parts of the bush which are infected by canker.

After pruning diseased bushes the pruning shears must be disinfected in a 5% solution of formalin.

Bushes heavily infected and weakened by canker, must be rejuvenated by means of cutting "na chernuiu golovku" [to a black cap or tip] or packing with "katavlakom".

When using the chemical means canker swellings are smeared over with 20% copper naphthenate, diluted with kerosene, in the early spring.

Chlorosis is produced by several causes of a non-parasitic character. Means for control of chlorosis consist in removing the causes which produce it in each individual case.

Drainage is constructed on wet, swampy soils; on highly calciferous ones a 5% solution of sulfuric acid is introduced. When there is lack of ferrous salts in the soil it is necessary to apply under each bush 200-400 g of green vitriol, diluted in 15-20 l of water, or to repeatedly spray the sick bushes with 1% solution of green vitriol.

Phylloxera is the most harmful pest of the grape vine. In a zone of grafted viniculture, where most of the plantings are infected by phylloxera, the basic method for its control is the cultivation of European varieties of grapes, which are grafted on phylloxera-resistant stocks.

In a zone of self-rooting cultivation of grapes the protection from phylloxera is conducted by way of strict adherence to prophylactic

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

quarantine measures, which are meant to prevent the import of this pest.

Phylloxera is spread from one region to another exclusively through the planting material, that is why all the viniculture farms and, especially, amateur grape growers must strictly observe the rules for rehandling and care for the planting material.

In case of detection of phylloxera or of characteristic damage to the roots of grapes (nodules, swellings) it is necessary to immediately inform the "raisovet" [District Soviet], or the quarantine inspection; they will take measures for extermination of the pest and for prevention of its spreading.

At the appearance of the raceme leaf roller or Th. ampelophaga Bayle the vineyards are dusted with 5% DDT dust, with calcium arsenate or 1% dust of thiophos in a norm: for the first dusting 15-20 kg per ha, for the following ones 20-25 kg.

DDT dust and thiophos can also be used for spraying; the first is used in the form of 2% suspension, and the second in 0.1% concentration. In the absence of these chemicals the bushes are sprayed with a suspension of Paris green.

For the control of the first generation of caterpillars of the raceme leaf roller 2 dustings or sprayings are needed. First - at the appearance of grape inflorescences and the second - after the end of blooming. For the control of the second generation of caterpillars the treatment is conducted at the end of June - beginning of July and for the third generation - at the end of August.

For the control of caterpillars of Th. ampelophaga Bayle the bushes are dusted at the beginning of swelling of buds, and further on at the same dates as for the leaf roller.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

If on grape vines there are present beetles of Otiorrhynchus turca Boh. or O. asphaltinus germ. When bushes are pruned it is necessary (Begin p. 81) to leave 15-20% more eyes than was planned. For the destruction of beetles in spring, when the grape buds begin to swell, the bushes and the soil are dusted with 5% DDT dust, or 12% dust of hexachloran in a dose of 100 kg per ha; following the dusting, chemicals are turned down into the soil: by a cultivator between the rows, and by a spade within the rows.

Soon after the opening of leaves a second dusting of the vineyard is conducted with the same chemicals in a norm of 40-50 kg of dust per ha, or with calcium arsenate in a dose of 25-30 kg.

At the appearance of young beetles (first half of June) the vineyards are sprayed with 4% solution of barium chloride, or dusted with DDT dust or calcium arsenate; after 8-10 days dusting is repeated.

Soon after harvesting the infected vineyards and the soil are dusted with DDT or hexachloran in a dose of 100 kg per ha, later the chemicals are turned down into the soil.

When grape Coccodea are present the infected bushes are generously sprayed (washed) during the fall-winter or early spring period with kerosene - lime emulsion or with 4% Carbolineum, or 6% solution of green vitriol. During the summer period a two or threefold dusting of infected leaves is conducted with 1% thiophos dust or sprayings with 1% suspension of this preparation. In the absence of thiophos, spraying can be done with 0.4% solution of anabasine-sulfate.

In southern regions it is expedient to also utilize a biological method for control of Coccodea with the aid of predator-beetles--Cryptolemus and Symphero*b*ius.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

For the protection of transplanted cuttings and germinating shoots from larvae of may beetles and of Colorado potato beetles the plot, which is assigned for the nursery must be treated with 12% hexachloran dust in a dose of 180-200 kg per ha. Treatment of the soil with this chemical is best done in August - September, so that in spring the cuttings can be planted into a disinfected plot. Hexachloran treatment can also be conducted at other times when the temperature in the soil, at a depth of 10 cm, is not less than 15° and is sufficiently moist. The chemical is introduced to a depth of 10-15 cm by a fertilizer drill or is uniformly spread over the surface and then immediately is turned under to a needed depth by any one of the soil cultivating impliments.

In order to protect young plantings, hexachloran is introduced into the planting holes in a dose of 15-20 g into each. Part of the chemical is used to dust the sides of the planting hole, the rest is carefully mixed up with the soil, which is then used to cover up the hole and to hill the young plant.

When planting nurseries in order to destroy caterpillars of various cutworm moths hexachloran is spread out between the rows in a norm of 30 g per 1 sq. m.

To destroy the spider mite, Tetranychus urticae Koch. in places of its overwintering the bushes must be smeared or abundantly sprayed (washed) in the fall or early spring, before the opening of buds, with the 5° ISO or 0.2% solution of thiophos. Soon after opening of the buds spraying should be done with ISO of 0.5 to 1° in strength or 0.1% solution of thiophos. Further on, depending on the development of the mites, additional 2-3 sprayings with the above chemicals are conducted at intervals of 2-3 weeks.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Good results for control of the spider mite are obtained from ester-sulfonate, used in 0.5% concentration.

Conducting of the above cited measures for the control of pests and diseases of vineyards will allow to increase the yield and improve its quality.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-749
(In full)
db/M

Agarkov, V. A.

Rzhavchina svekly i mery bor'by s nei.

[Beet rust and methods for its control].

Agrobiologia, no. 3, p. 96-105, May/June 1955. 20 Ag822

(In Russian)

On beet plantings of Uladovo-Liulinetskoi Selection Station (Vinnitskaia oblast') sugar beets succumb to rust every year.

The laboratory of the station's phytopathology has set for itself a problem to work out a method for the control of this disease, and by utilizing it, to liquidate the nidus of rust. Work in this regard was conducted since 1949(1).

A 749

The pathogen of beet rust is, as it is known, a parasitic fungus Uromyces betae (Pers.) Lev., which develops on beets in all the three stages: spring (aecial), summer (uredostage), and winter (teliostage).

The cycle of beet rust under conditions of USSR has already been described in literature, but to many agricultural workers, including the beet growers, this disease is still little known. That is why we think it necessary to speak about the peculiarities of the parasite and of the disease produced by it.

---

1. In 1950-1953 T. I. Levkovskaia and E. A. Kolonuets took part in it.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

During the last four years we conducted systematic observations of the appearance and development of rust. Results of observations of dates of appearance of one or the other stage of rust on transplanted plants and on beets of the first year are given in table 1.

Let us note that dates of planting of transplants corresponds to the onset of spring.

In some years of observations (1950) spring was early and comparatively warm, in others (1952) - late, but with rapid and continuous thawing of snow, then again it started at an intermediate date (1951,1953), but was long drawn out and cold (1953).

The course of disease was as follows. At the moment when the sprouts of transplants appeared (usually during the first half of May), when dug up, on the head of the root one could discover yellow-orange convex spots of rust in aecial stage on petioles and on blades of leaves, yet white, on peripheral buds (Fig. 1). Somewhat later the spots appeared also on the green blades and petioles of the outer part of the rosette (Fig. 2).

We did not see any such spots on the center of the rosette.

Aecidium ripen and open up after 5-10 days in these spots.

The period of spot appearance is very lengthy and finishes usually at the middle of June, and during some years even at the end of June. 20-35 days after aecidium atart opening on the lower leaves of the transplant's bush, (Begin p. 97) the first appearance of uredostage was noted. Depending on conditions of spring this can also happen during the last days of May, or the last days of June (table 1). Rust passes over from transplants to beets of the first year in 30-40 days after the appearance of the summer stage on transplants, when beets are away from them at a distance to 1 km. When

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

they are grown jointly, the uredostage can appear on both the beets and the transplants almost simultaneously.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Dates of appearance of rust on beets.

Table 1

Year	Date of planting the trans-plants	Aecial stage		Uredostage				Teliostage	
		Trans-plants	Beets of the first year	Opening up of aeciums	Trans-plants	Beets of the first year		Trans-plants	Beets of the first year
						Side by side with trans-plants	1000 m away from trans-plants		
1950	March 31	April 30	Not found	Not re-gistered	May 29	0	July 15	Not registered	
1951	April 14	May 10	"	May 15	June 4	0	" 22	July 12	August 8
1952	" 24	" 6	"	May 16	" 25	June 27	August 2	Not registered	
1953	" 13	" 16	"	" 25	" 30	0	" 10	Not registered	
1954	" 9	" 8	"	" 20	" 2	July 12	" 5	July 6	Not re-gistered

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Teliospores do not in general appear at the end of the vegetation period of plants, but at the end of formation of every given leaf or of its part. Evidently, they form because conditions for the existence of the parasitic organism have deteriorated in connection with the approaching death of the part of the leaf which nourished it. Thus, for instance, in 1951 their formation on the oppressed beets was seen August 8, that is very soon after the appearance on it of rust in the summer stage.

During the following year beet rust reappears in aecial stage. This indicates that the parasite overwinters in the stage of teliospores. That is why it is important not to let them overwinter on the remains of affected plants, on seeds and on tips of mother roots.

In order to prevent the parasite from overwintering on the remains of plants it is necessary to remove them from transplanting fields, from threshing places and fields, where beets were grown, or destroy these remains yet in autumn, and plow the soil with a plow equipped with a plow-point.

Rendering the teliospores harmless on seeds is achieved by disinfecting them with granosan in a dose of 300-400 g of the preparation for 1 c of seeds, or with formalin (a wet method).

From table 1 it is seen that under field conditions rust first appears on transplants, and only later passes over to the beets of the first year. Consequently, the main source of its resumption - (Begin p. 98) the teliospores overwinter on the tips of the mother roots. That is the reason why the transplant roots must be rendered harmless.

Title of Figure 1. Young leaves of sugar beet sprouts of transplants, heavily infected by the aecial stage of rust.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

We conducted our first experiment in this direction in 1949-1950. During the fall of 1949 we selected from one plantation of factory beets, in a neighboring kolkhoz, some plants with leaves very infected by rust.

The cleaned roots were additionally infected. They were rubbed by infected leaves. Before putting them away for winter every 100 roots were disinfected by an appropriate fungicide. They were kept in ordinary, covered piles. In spring of 1950 before planting the roots all shoots were trimmed. Data about the number of plants which were infected by aecial stage, are given in table 2, according to variants of the experiment.

Table 2

Infection of beet transplants (variety U 1030) by aecial stage

Variant *	Roots planted	Germinated plants	% of infected plants
Roots not disinfected, control	90	81	7.4
Granosan 0.1 g, dusting of the tip	90	79	0
" 0.5 g, " " " "	30	19	0
" 0.6 g, " of the whole root.	90	64	5.9
Bordeaux mixture, 3% solution, immersion for 30 min.	90	84	2.4
Same, 1% solution, immersion for 30 min.	90	61	7.4
Formalin (1:300), immersion for 1 min, with a 2 hour steaming	30	81	6.2
Granosan 0.89 g, dusting of the whole root	90	87	4.6

*Shoots were trimmed for all variants.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Best results were obtained on the variant, where tips were dusted (rubbed by hand) with granosan, spending for each one 0.1 g of the preparation. Increase of dosage up to 0.5 g acted destructively on the shoots. In this variant out of 100 [sic] roots towards spring only 19 germinated. Let us note, that with a 1 g dose of preparation for one tip all the roots lost their germinating power and were heavily infected by Penicillium.

Thus, dusting the tips with granosan although being a very effective method, it is dangerous nevertheless, because with a high dose it is possible to kill the buds. Dusting the roots before putting them away in covered piles was little effective, because the preparation did not reach the whole surface of the tip. (Begin p. 99)

Title of Fig. 2. Leaves of transplants, infected by aecial stage of rust; upper row - mature leaves, which were infected by basidiospores after germination; the lower row - leaves of peripheral buds, lagging in development.

Besides this, granosan, in its present form, numbs the skin of the root, which leads to its rotting further on. Consequently, dry disinfection of roots with granosan of ordinary composition cannot be recommended for production. For this purpose granosan is needed with a smaller content of the active ingredient.

Comparatively good results were obtained by treating roots by means of immersion for 30 minutes into a 5% solution of Bordeaux mixture. The action of formalin (1:300) and of 1% solution of the Bordeaux mixture was weak.

In connection with prospects for dry disinfection of roots with granosan a water suspension of granosan was tested.

For this experiment roots of reproductive beets, very heavily damaged by

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

rust, were selected. One part of them was treated in autumn, the other in spring before planting (table 3).

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Action of fungicides on the appearance of aecial stage of rust in 1951, variety U 752

Variants	Concentration of the preparation (in %)	Exposure during immersion (in min.)	Roots (number of pieces) planted	germinated	infected	% of infection
Roots, not disinfected, control	-	-	95	92	49	53.3
Treated in fall						
Bordeaux mixture	3	30	100	97	14	14.4
Same	1	30	98	94	22	23.4
Germisan	0.25	30	91	88	17	19.3
Same	0.25	30	92	87	2	12.3
"	0.1	30	98	96	10	10.6
Formalin, 2-hour steaming	(1:300)	3	82	79	12	15.2
Treated in spring						
Bordeaux mixture	3	30	100	98	9	9.2
Granosan	0.25	30	100	96	2	2.1
Same	0.1	30	99	96	12	12.5
Formalin, 2-hour steaming	(1:300)	3	100	94	9	9.6
Boric acid	0.01	30	100	94	47	50.0
Manganese sulfate	0.05	30	97	92	47	51.1

* For all variants the shoots were cut off.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Quite satisfactory were the results of treatment of roots with 0.25% suspension of granosan (NIUIF-2) with a 30 minute (Begin p. 100) exposure by immersion. Disinfection of roots with such an infection can be done either in the fall - before storage, or in spring - before planting.

Disinfection with formalin, Bordeaux mixture and germisan on the whole was not satisfactory.

Treatment of roots by solutions of microelements, boron and manganese, did not produce any influence on infection of plants with the aecial stage of rust.

Results of the 1951 experiment allowed to recommend as an active measure for rust control disinfection of roots by a granosan suspension. But this method needed to be improved. In the experiment of 1952 we cleared up the question as to whether it were possible to shorten the exposure during immersion and to substitute immersion by spraying.

In the fall of 1951 we chose from the reproduction beets the roots with highly infected leaves. They were not subjected to artificial infection.

Results of the experiment are given in table 4.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 4

Results of spring disinfection of transplanting roots for the aecial stage of rust (Laboratory of Phytopathology, 1952, Variety U 752)

Variant *	Number of roots planted	Plants germinated	Infected plants	% of infected plants
Roots not disinfected, control	100	98	48	49.0
Disinfection with granosan				
0.5% immersion for 1 min.	100	100	17	17.0
0.5% " " 10 "	100	100	7	7.0
0.5% " " 20 "	100	99	6	6.1
0.5% " " 30 "	99	96	5	5.2
0.5% spraying	100	99	23	23.2
0.25%, immersion for 30 min.	100	99	16	16.2 **

* In all variants the shoots were trimmed.

** In 1952 the toxicity of granosan was decreased and its action in 0.25% concentration was weak.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Data of table 4 allow to assume that, when disinfecting roots with medium infection with granosan suspension, it is enough to expose them for 10 minutes; disinfection does not achieve its purpose if the exposure is reduced to 1 minute, or if immersion of roots into the liquid is substituted by spraying.

In 1953, during an experiment of spring disinfection of roots, fungicides were tested and a possibility of further shortening the exposure during immersions was examined. (table 5).

From table 5 it is seen, that the number of plants, infected by the aecial stage of rust, in the control did not go beyond 20%, which testifies about a much weaker infection of roots by teliospores, than during the two preceding years. Under these circumstances it is possible to disinfect the roots with 0.25-0.5% suspension of granosan during a 5 minute exposure.

From among other fungicides a good action was produced by 15% tetramethylthiuramdisulfide (TMTD). This preparation fully disinfected the roots in solution 2:100 at a 5 minute exposure, or in solution 1:100 at a 10 minute exposure. (Begin p. 101)

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 5

Results of tests of fungicides for disinfection of transplanting roots (Laboratory of Phytopathology, 1953, Variety U 752).

Variant *	Exposure during immersion (in min.)	Remained from 100 transplanted roots	Among them diseased	% of diseased (aecial stage)
Roots not treated, control	-	97	19	19.6
Granosan 0.5%	5	94	0	0
Granosan Same	10	95	2	2.1
Granosan 0.25%	5	89	0	0
Granosan Same	10	90	1	1.1
TMTD 2:100	1	90	6	6.7
TMTD 2:100	5	89	0	0
TMTD 2:100	10	94	1	1.1
TMTD 1:100	5	85	1	1.2
TMTD 1:100	10	91	0	0
Formalin, 40% (1:300), steaming 2 hours	1	91	4	4.4
	5	91	0	0
Copper oxychloride, 1%	5	82	1	1.2
	10	94	5	5.3
Bordeaux mixture, 1%	5	92	5	5.4
	10	93	2	2.2

* Shoots were cut off in all variants.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

No full disinfection was achieved by utilizing 1% copper oxychloride or 1% Bordeaux mixture, even in the cases where plants were mildly infected.

Formalin, which in former experiments did not give satisfactory results, can disinfect the roots, if they are kept in an immersed state not less than 6 minutes.

An advantage of immersion of roots into a solution over spraying and dusting we explain by the fact that during the first method the preparation comes into contact with the spores, while during the other two it does not. A full contact with overwintering spores occurs in that case when fungicides are in a gaseous state. But the gaseous disinfection is very complicated.

Disinfection of transplanting roots with granosan suspension, a method, developed by the phytopathology laboratory for the control of rust, was first tested by Uladovo - Liulinetskaia Station in 1952 - 1953. A 0.20% concentration suspension was utilized during disinfection.

In order to evaluate the action of this method non-disinfected roots were planted in a separate bed; they were taken from three of the covered piles (of an early, intermediate and late stacking up). 600 roots were taken in 1952, while in 1953 - 300.

Results of findings of rust infections in transplants are shown in table 6.

Data given there show that disinfection of roots is one of the most expedient methods for rust control: compared to the control, it sharply decreases the infection of transplants by both the spring and the summer stages of rust. This allows to make a conclusion that by disinfecting the roots and by treating the green plants with fungicides, for several years at a time, it is possible to liquidate a rust nidus. (Begin p. 102)

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 6

Influence of disinfection of roots with granosan on infection of transplants by the spring and summer stage of rust.

Variant	% of infected plants				
	aecial stage		uredostage		
	1952	1953	1951	1952	1953
Control (roots left untreated)	21.4	13.0	-	84.5	52.0
Main field of 24 ha (in 1952 and 1953 roots were disinfected)	3.84	2.4	48.8	15.5	6.08

When calculating the requirements of the preparation we proceed from the following. Per one t of roots we spend 100 l of suspension. With an average weight of a root of 500 g, the general weight of all roots, planted on one ha (about 20 thousand), is 10 t. In order to disinfect such a number 1000 l of suspension is needed. To obtain 0.26% suspension for each 1 l of water 2.6 g of the preparation should be taken. To disinfect the roots, transplanted on 1 ha one needs 2.6 kg of granosan.

In connection with the possibility for utilizing the preparation NIUIF-2 (granosan) for wet disinfection, our industry should put out a preparation with a filler which is water soluble, or in a form of 2-3% solution of ethyl mercuric chloride.

During the last four years (1949-1953) in the Uladovo-Liulinetskoi Selection Station besides the disinfection of roots the following other methods for the control of beet rust were tested: the autumn rejection of the heavily infected plants of the mother-beets; trimming of shoots when taking out the roots from storage piles; disinfection of seeds with

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

granosan; spatial isolation of beets from transplants; removing the infected leaves from transplants before the opening of aecidiums; treatment of green plants with fungicides. It was ascertained that the autumn rejection of plants, which are heavily infected by rust, aids in decreasing the infection of transplants by the aecial stage. First of all should be rejected those of infected plants on the leaves of which predominate pustules with teliospores.

According to data of Z. A. Pozhar (1), teliospores of beet rust can germinate at a temperature of 7-8°. Such temperature often occurs in storage piles (especially during the first months of storage). Thus teliospores can still germinate thus infecting with basidiospores the shoots of sprouting buds. The fact of teliospores' germination and of their infection of shoots is confirmed by our finding many times on the shoots yellow spots of the aecial stage when making analyses during winter and early spring. In its initial mass the rust (aecidal stage) is in a hidden state. Owing to trimming of shoots, which grew during the storage period, the number of infected plants in most cases was somewhat smaller (table 7).

One should keep in mind, that the leaves of the peripheral buds are the most often infected because the greatest number of teliospores group themselves on the periphery of the tip. That is why it is necessary to carefully cut off the shoots not only from the central part, but also from the peripheral part of the tip, which is not always done.

Conducting, in 1949-1951, experiments in which the best doses of granosan for disinfection of seeds were determined, which were naturally or [sentence is continued on page 103 after table 7] (Begin p. 103)

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 7

Influence of trimming the shoots, when removing the roots from storage, on infection of transplants with aecial stage of rust

Variant	% of infected plants					on the average
	1950	1951	1952	1953	1954	
Shoots untrimmed	13.6	76.3	48.5	14.8	56.6	41.8
Shoots trimmed	7.4	55.3	49.0	19.6	56.1	25.9

artificially (1951) infected by rust, we could not evaluate the action of granosan on rust, as the aecial stage was not found in any of the variants during the years of test, including also 1951, when the naturally infected seeds were additionally dusted with a powder made of infected leaves.

In 1952 the plots of industrial and of mother-beets were sown to seeds of the regionalized variety U 752, taken out from one lot. The planting of industrial beets was next to transplants, but the mother-beets quite a distance away from them, in another crop rotation. Data about dynamics of rust development on these plots is given in table 8.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 8

Influence of spatial isolation on development of rust on beets of first year (department Novyi, 1952, variety U 752)

Plot	Distance from transplant	Indicator of infection	Date of checking				
			2/VIII	12/VIII	22/VIII	15/IX	1/X
Mother-beets	1500m	% of diseased plants	0.2	0.8	4.8	29.4	81.0
		Average point	0.0002	0.0008	0.0048	0.064	0.27
Industrial beets	Next to	% of diseased plants	11.0	52.0	68.4	79.6	92.6
		Average point	0.01	0.11	0.15	0.44	0.79

Data of table 8 show that removal of beets from transplants to a distance of 1.5 km is retarding in the spreading of rust and decreases the rate of infection of plants, but does not have that decisive importance which it has in connection with Peronosporoa.

Tests of fungicides for the control of rust on green plants of beets were begun by the laboratory only since 1952.

Experiments were conducted with industrial beets, which in 1952 were next to transplants and in 1953 1 km away from them.

Spraying was done with the aid of a sprayer of "Avtomaks" type, dusting was done by hand. Output of liquid for the first sprayings was 600 l per ha, for the following - 800 l per ha. The area of plots in 1952 was 100 sq. m. and in 1953 - 50 sq. m. Replication of the experiment was fourfold.

The following fungicides were tested: 15% tetramethylthiuramdisulfide (TMTD) in 1952 and 50% in 1953; 15% dinitro- (Begin p. 104) thiocyanogenbenzene

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

(DRB) in 1963; copper oxychloride (spraying); copper oxychloride (dusting); 1% Bordeaux mixture.

In 1962 beets were treated twice at the beginning of development of disease. Further on no treatments were conducted, as it was thought that dry weather, which prevailed in August, will check the spreading and development of rust. Infection of plants was tallied several times up to the beginning of digging of industrial beets (table 9).

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 9

Influence of double treatment of beets during the first month of spreading of rust on development of disease and yield of roots (department Novyi, variety U 752)

Variant	Date of spraying		Date of checking					Point of infection	Yield of roots (in c/ha)	Contents of sugar (in %)
	1 st	2nd	4/VII	12/VII	26/VII	13/VIII	12/IX			
			% of diseased plants							
Without treatment, control			single case	1.0	18.8	74.5	92.5	0.59	307.2	16.5
Bordeaux mixture, 1%	July 5	July 28	Same	1.0	20.5	71.5	83.0	0.51	319.8	16.5
15% TMTD (1:100)	"	"	"	0.75	16.3	69.0	87.8	0.59	326.6	15.9
Copper oxychloride, 1%	"	"	"	1.25	18.0	66.0	84.8	0.48	310.2	16.4
Copper oxychloride, dusting (10 kg/ha)	"	"	"	1.25	19.5	70.5	87.5	0.49	311.2	16.3

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Treatment of beets by fungicides during the examined periods almost did not hamper the spreading and development of rust. Dry weather, which was noted at the end of July and the first half of August did not produce such influence on rust, as it does on Peronospora. Consequently, treatment of beets must be conducted regularly, regardless of weather.

In variants with treatments with Bordeaux mixture and TMTD the yield of roots increased somewhat (by 12.6 and 19.4 c per ha). Decrease of sugar content by 0.6% under the influence of TMTD can be probably explained by the fact, that in this variant the tops grew much more intensively: their weight during digging was 35 c per ha higher than in the control.

For control of uredostage of rust it is possible to recommend 1% Bordeaux mixture, 1% copper oxychloride and 0.6% TMTD. The period of time between sprayings must not exceed 12-15 days.

CONCLUSIONS

1. Under conditions of Uladovo-Liulinetskoi Experiment-Selection Station the beet rust yearly regenerates in the form of aecial stage on leaves of transplants. Therefore, the parasite overwinters in the stage of telio- (Begin p. 105) spores. That is why first of all it is necessary not to allow the teliospores to overwinter and germinate near the growing beets.

2. The best fungicide for disinfecting the roots is preparation NIUIF-2 (granosan) in a form of 0.25-0.5% suspension. When infection of roots is only slight it is possible to utilize 40% formalin in solution 1:300 or the new preparation TMTD (tetramethylthiuramdisulfide) in a form of a 0.2% solution.

3. From among the three tested methods of disinfecting the roots with granosan (dusting, spraying and immersion) full disinfection was achieved

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

by immersion of roots in the solution for 5-10 minutes.

When disinfecting with a fungicide observance of 5-10 minute exposure is compulsory because during this time the solution comes in contact with those spores which are covered by remnants of petioles.

It is possible to disinfect the roots either in the fall or in spring.

4. It is necessary to put out granosan with a filler, which is soluble in water, or in a form of 2-3% solution of ethyl mercuric chloride.

5. Together with disinfection of roots and of seeds, cleaning of fields from the remains of beets, it is expedient for the control of beet rust to utilize also the following measures, which were tested in experiments and under production conditions:

reject in the fall the heavily infected plants of mother-beets, and in the first place the plants where teliospores predominate in the pustules;

when taking out roots from storage piles trim off the sprouts, as well as the smallest of the peripheral buds;

observe spatial isolation - to place beet plantings, especially of mother-beets, 1-1.5 km from transplants.

The problem of rust control on green plants requires further studies. It is necessary to continue searching for more effective fungicides and define more accurately the periods of treatment.

L I T E R A T U R E

1. Z.A. Pozhar, A.Ia. Ovcharenko. Rust of sugar beets and methods for its control. "Trudy VNIS", V. XXXII, 1950.

2. Pests and diseases of sugar beets. Sel'khozgiz, 1952.

Uladovo-Liulinetskaia
Experiment - Selection
Station

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-750
(Conclusions and
references)
db / A

Babaian, A.A., and Karapetian, K.A.

Effektivnost' sernokislotnogo-mekhanicheskogo sposoba delinterovki semian protiv gommoza.

[Effectiveness of the sulphuric acid-mechanical method of delinting seed against gummosis].

Akad. Nauk Armianskoi SSR. Izv. Biol i Sel'skokhoz. Nauki, vol. 7, no. 10, pp. 57-64. Oct. 1964 20 Er4

(In Russian)

A 750

CONCLUSIONS

1. Under Armenian conditions testing of seed delinted by the sulphuric acid-mechanical method and supplementary treatment with the NIUIF-2 [released by Scientific-Research Institute of Fertilizers and Insectifungicides] preparation, conducted by the Moldavian Station of Plant Protection, has shown good results of this method in gummosis control.

2. The emergence of sprouts from delinted seed occurs more energetically than from seed treated with formalin. This difference is particularly pronounced in sorted seed possessing a heavy specific gravity.

3. A heavy fraction of delinted seed treated with the NIUIF-2 preparation in the 1952 experiment (seeding date April 19) produced a considerable excess in yield as compared with that of seed treated by the conventional method. At the same time, under soil conditions less favorable for seed germination, the rate at which sprouts appear from delinted seed

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

falls behind that of seed which had not been delinted, but had been treated with the same NIUIF-2 preparation.

4. It is essential that more extensive tests be made of seed delinted by this method sown in diverse soil types, at different dates etc. It is quite possible that in those districts where provisions have been made primarily for the use of the sulphuric acid-mechanical method of seed delinting, it will be necessary to find a different [differentsirovanno] approach to the problem of seed grain disinfection. It, probably, will be necessary to apply the NIUIF-2 preparation to undelinted seed which are to be sown early as well as in soils with increased moisture capacity, colder and heavier soils, but seed to be sown on optimal dates in warm, light soils should first be delinted.

Armianskii Nauchno-Issledovatel'skii
Institut Tekhnicheskikh Kul'tur
g. Echmiadzin

Received at editor's office
Dec. 21, 1953

REFERENCES

1. Babaian, A.A., Kirakosian, A.V. and Bezhanian, Z.S. Material for the study of cotton gummosis and of its control measures in the ZSFSR. Izd. ZakNIKHI, Tbilisi, 1936.

2. Babaian, A.A. and Khodzhaian, E.A. Seed disinfectants of local production in the control of cotton gummosis in Armenia. Sb. Trudov po Zashchite Rastenii, ArmNIITK, I, 1946.

3. Vasil'ev, A. Centralized disinfection of cotton seed against gummosis. Zhurn. "Sovetskii Khlopok", 11-12, 1939.

4. Vasil'ev, A.A. Centralized disinfection of cotton seed against gummosis, 1950.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

5. Vatolkina, K. Evaluation of disinfectants and methods of cotton seed disinfection against gummosis. Zhurn. "Khlopkovodstvo", 12, 1951.

6. Verderevskii, D.D., Vasin, P.F., Vyskvorko, G.G. and Koskovets, S.N. Collection of "Gummosis of cotton", Izd. ZakNIKHI, 1936.

7. Verderevskii, D., Lukashevich, P., Leont'eva, N. and Trubnikov, A. New sulphuric acid-mechanical method for delinting of cotton seed grain. Zhurn. "Khlopkovodstvo", 12, 1952.

8. Grushevskii, V.K. and Grushevskii, N.K. BTSPT-1 experimental workshop for centralized disinfection of cotton seed in the control of gummosis. Zhurn. "Zashchita Rastenii", 4, 1950.

9. Karimov, M.A. Situation of problem concerning control measures for cotton gummosis, 1936, Tashkent.

10. Karimov, M.A. Results of study of the comparative effectiveness of cotton seed disinfectants in the control of gummosis. Sb. materialov po Zashchite rastenii, Izd. SoiuzNIKHI, 1936.

11. Lebedeva, O.P. Results of work investigating the disinfective action of sulphuric acid in delinting cotton seed. Sb. "Gommoz Khlopchatnika", Izd. ZakNIKHI, 1936.

12. Serbinov, V.I. Materials on gummosis elimination [k ekonomike gommoza] and on measures for its control. Tashkent, 1934.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-751
(Table of Contents)
db/M

Pavlovskii, E.N., Baranov, P.A., and Il'in, M.M., eds.

Pustyni SSSR i ikh osvoenie. II.

[Deserts of USSR and their reclamation]

Moskva, Akademiia Nauk SSSR, 1954. 601 p. 409 P282

(In Russian)

CONTENTS (p. 600-601)

	Page
Preface	3
M.M. Il'in. Problems in studies of plant resources during desert reclamation	5
S.L. Ivanov. Biochemical variability in plants at a transfer from a desert life to irrigated conditions	49
E.A. Maliukin. Methods of reclamation of sandy semi-deserts of Western Kazakhstan by means of plant cultivation	66
N.I. Sharapov. Plant cultivation base in subtropics of Turkmenistan	135
F.N. Rusanov. Possibility for yucca cultivation on the Caspian plain in Turkmen SSR	177
E.N. Blagoveshchenskii. About problems of Kara Kum Station in connection with forest meliorating measures in deserts	181
I.V. Larin. Principal ways for creating a stable feeding base for livestock raising in Caspian lowlands and other desert and semi-desert regions	191
I.A. Tsatsenkin. Measures for improvement and utilization of grazing lands and hayfields in the western part of Caspian lowlands and "Ergenei" mountains	203
S.A. Nikitin. Vegetation of the eastern part of Caspian lowlands	216
T.N. Shcherbinovskaia. Vegetation of waste lands of semi-desert western part near the Caspian sea and their utilization	265
I.I. Terenozhkin. On ecology and regionalization of Agropyrum in the South - East	279
O.N. Chizhikov. Influence of burning out on composition and yielding capacity of semi-desert winter grazing lands in Caspian lowlands	291

A 751

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

N.T. Nechaeva. Influence of grazing on the grazing lands of Kara Kum as a foundation for pasture rotations---------- 303
N.T. Nechaeva. Seediness of pastures in south - eastern Kara Kum and influence of pasturing on plowing under the seeds------- 371
L.E. Rodin. Role of vegetation in the formation of takyr and of their complexes---------- 392
V.V. Nikitin and A.A. Meshcheriakov. Water and shore vegetation of Murgabski reservoirs---------- 414
A.G. Gael'. Sands between Volga and Ural rivers and a possibility for their setting and afforestation---------- 430
N.G. Zakharov and I.B. Revut. Setting of moving sands by means of bitumen emulsion---------- 449
V.N. Kunin. About qualitative norms of water-utilization under desert conditions---------- 465
V.V. Bogdanov. Temporary surface run-off on takyrs---------- 488
E.N. Blagoveshchenskii. About condensation moisture in desert soils---------- 508
A.V. Vinter and N.M. Tikhomirov. Wind energy as a powerful factor in an economic reclamation of deserts---------- 520
N.N. Dzens-Litovskaia. Geographical conditions of soil formation and processes of salification in Sundukli desert---------- 566
A.N. Krishtofovich. Origin of xerophyte plant formations in the light of paleobotany---------- 583
V.P. Grichuk. About the possibility of using sporo-pollen analysis for studies of kainosite deposits in Central Asia------- 597
E.D. Zaklinskaia. Morphology of pollen of certain forms of desert plants---------- 602
(Begin p. 801.)
A.N. Gladkova and S.R. Samoilovich. Morphology of pollen of certain forms of tropical and arid sub-tropical plants------ 634
M. Kh. Monoszon. About the similarity and difference of pollen of genera Arthrophytum Schrenk, Hammada Tljin, Haloxylon Bge and Anabasis L---------- 746
D.M. Steinberg. Materials on fauna of insects-predators in sand-bracing crops of western Turkmenistan---------- 750
V.A. Stal'makova. Rodents of Kara Kum, their ecology and economic importance---------- 756
Index of Latin names of plants---------- 783
Index of Latin names of insects---------- 798
Index of Latin names of animals---------- 799

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-752
(Abstract)
db/M

Annian, R.N., Grigorian, N.F., and Babaian, A.A.

Predposevnoe opudrivanie semian khlopchatnika v bor'be s sosushchimi vrediteliami.

[Preplanting dusting of cotton plant seeds in the control of suctorial insects].

Akad. Nauk Armianskoi SSR. Izv. Biol. i Sel'skokhoz. Nauk., v. 9, no. 8, p. 123-130, Mar. 1956. 20 Er4

(In Russian)

It was found, through research, by E.N. Kozlova, E.I. Dvortsova, and others that DDT, hexachloran, preparation no. 47 and thiophos can enter the plant tissues from the soil or after dusting the seeds, and the plants become toxic to many pests of agricultural crops, including cobweb mites (Tetranychus urticae Koch.) and aphids on cotton.

A.V. Fliagina and E. Ivanova have established through experiments that preplanting dusting with hexachloran of cotton plant seeds protects the young shoots from damage by caterpillars of stem borers. Recommended dose is 6 kg per 1 c of seeds.

A 752

In 1953-1954 Armenian Scientific-Research Institute of Technical Crops conducted experiments on preplanting dusting.

Hexachloran dust was applied to cotton seeds after their preliminary disinfection against gummosis. They used granosan in 1953 and formalin in 1954 experiments.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Tests were in 4 replications in a kolkhoz and on the Institute's base.

Results of experiments on the base show that treatment of seeds with 12% hexachloran dust in a dose of 6 to 8 kg per 1 c. produced a negative influence on the energy of germination and sprouting of seeds.

Data in table 1 show that from a dose of 8 kg per 1 c of seeds germination comprised 62%, dose of 6 kg - 66 to 68%, while control showed 80 to 84%.

Later on the shoots began to dry out. 8 kg. dose showed 21.4% of drying up, while 6 kg - 10.6%. 4 kg. dose showed the least percentage of shoots drying.

Although in 1953 the 4 kg. dose affected the germination, in 1954 it did not, as seen from table 2. Percentage there is 72.5 for hexachloran and 76% for the control.

Table 3 gives results on the thickness of stands of shoots after tractor sowing in 1954 of seeds dusted with hexachloran in a dose of 4 kg. per 1 c of seeds. Thickness of stands of shoots of the dusted seeds was somewhat greater, than on the control. But it is explained by the fact, that dusted seeds, after being treated with formalin, had a better viability than the control seeds. And more of dusted seeds were planted per each running meter compared to the control. This then explains the denser stands of shoots and it cannot be ascribed to a stimulating action of hexachloran.

In tests on the base, where the same number of seeds (5) was put into every hill, dusted seeds in all cases had lighter germination than the control.

But the lowering of germination of seeds, which were dusted in a dose of 4 kg per 1 c did not produce any negative influence on the yield of cotton as seen from table 6.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Calculations of experimental results were timed to certain periods of development of the cited pests on cotton plants. A certain decrease in infection of plants by suctorial pests was established.

Data show that in all experiments a lessening in infection by cobweb mites and aphids was obtained.

Also, from results of tests made in 1955 (Table 4), it was found that application of hexachloran into the soil, after the appearance of shoots, in a dose of 40 kg/ha, which was done in order to make cotton plants toxic to the aphids, did not produce any lessening of infection of cotton by this pest. This may be explained by lack of sufficient moisture in the soil at the time of application of poison.

Tables 4 and 6 show that application of hexachloran dust to the soil at the appearance of shoots and during blooming had a slight effect in the control of cobweb mites. But it was found that preplanting dusting of seeds is a cheaper method of pest control.

Our research showed that preplanting dusting of seeds has no effect on control of caterpillars of the mallow (Malva) moths.

As a result of preplanting dusting of seeds with hexachloran, and its application to the soil during the negetative period, the experiments showed an increase of yield of cotton - fibre (table 6), an increase in the number of leaves and fruits (table 7). This can be explained not so much by a stimulating action of the preparation on cotton, as by the fact that damage to the plant by suctorial insects, cobweb mite in particular, was lessened.

Results of our researches do not comply with data of E.N. Kozlova, A.A. Smironova and others; in their experiments in Tadzhikistan they

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

obtained an increase of fruits by 203.2% from application of hexachloran into the soil at the rate of 40 kg/ha compared to the control variant. There probably were other factors which are not mentioned by the authors.

The above data give basis for the recommendation of wide use of pre-planting dusting of seeds with 12% hexachloran dust, at a rate of 4 kg per c of seeds for control of suctorial pests.

If this preparation is, at the same time, used for control of stem borers, in their usual midi of propagation, it is necessary to increase the rate up to 6 kg per 1 c of seeds. A possible negative influence of such dose on germination will be compensated by smaller damage done by stem borers.

One should still use chemical methods of pest control during vegetation period of cotton but in smaller doses.

When dusting cotton seeds on broad production levels it would be wise to use complex preparations which will simultaneously control pests and diseases of cotton.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-753
(In full)
db/M

Ryzhkov, V.L.

Systematika virusov i ee znachenie dlia sel'skogo khoziaistva.

[Systematics of viruses and its importance for agriculture].

Bot. Zhur. [Moskva] v. 39, no. 6, pp. 797-808.
Nov/Dec 1954. 451 R925

(In Russian)

In the epoch when Linnaeus created his system of the animal and plant worlds, pressure of viruses on mankind was felt much stronger than it is now. How great it was can be judged even from Linnaeus' anxiety that his son's bride did not yet have smallpox. It seemed inevitable to have smallpox. And what is going to happen to her or her beauty if she gets smallpox? Thus thought Linnaeus! And yet at the present time smallpox is fully eliminated on the whole territory of the Soviet Union.

Thus, Linnaeus came in contact with viruses very directly, and one of the disciples of the great systematist, Rotteram, even wrote a whole monograph about smallpox (Andrews, 1961). Of course, in the time of Linnaeus there could not even be any talk about formation of a system of viruses; one needed a more thorough acquaintance with them, than to know them only from the effect produced by them. An attempt, made in 1939 by Holmes, to systematize the viruses which infect plants was yet, to a large degree, an attempt made with worthless means (Holmes, 1939). At that time we knew

H
753

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

very little about the nature of viruses, and may be this was the reason why Holmes has built his system not according to properties of viruses themselves, but according to symptoms produced by them. Thus, he relates to one genus, Marmor, all the viruses which produce mosiac diseases, regardless of their properties. We shall not, nevertheless, return here to the criticism of principles which were used for the foundation of Holmes' system. We already criticized it previously (Ryzhkov, 1947, 1950, 1952) and they did not receive any recognition from International Congresses, where problems of systemics of viruses were discussed (Andrews, 1952, 1954). Holmes' undisputed service was his application to them of binomial nomenclature, as well as his joining the evolutionary understanding of the origin of viruses (Holmes, 1951).

A basic change has occurred in the study of viruses at the present time. We can isolate viruses in a form of pure preparations in amounts that make viruses practicable for a detailed chemical analysis. Owing to the electron microscope separate virus individuals became available for direct observations. A circumstance, that many viruses, depending on their size, exist in the field of molecules made it possible to apply to virus individuals those same methods of exact science, which are applied to molecules.

It is the isolation, in a purified form, of the first virus "preparation"- (Begin p. 798) the classical virus of mosaic disease of tobacco - that put a question, in all its acuteness, about the applicability to the viruses of the species idea. In fact, the virus of tobacco mosaic disease proved to be a nucleoproteid, lacking all traces of lipoids, and its particle, its element, if you please, is a hexagonal prism, being about 300 mμ in

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

length and 15 mμ in width. The constitution of this virus element is crystallic, and no traces of water were found therein. One should mention though, that according to many new experimental data, the element of tobacco mosaic virus, as we are describing it here, is rather a quiescent form of this virus, its "spore" rather than a form in which this virus reproduces itself within the cell. However, together with the isolation of the virus nucleoproteids, science ran into fundamentally new facts. It was necessary to decide, which place they occupy in nature; are these infection agents a new, unusual form of life, or should they be relegated to inanimate nature. This question could not be decided upon only by methods of chemical and physical researches, a way which was principally taken by foreign science. For the solution of this problem it was necessary to examine viruses in all those relations, in which they really exist in nature. This prompted us to undertake a study of physiological conditions of reproduction of the virus of the mosaic disease of tobacco. Already during the first steps of our researches in this field we became convinced that this virus displays a certain specific autonomy and behaves as a true parasite. This forced us (Ryzhkov, 1938) to come forward with a paradoxical characteristic of viruses as parasitic proteins. We then took upon ourselves, quite consciously, a serious responsibility, and at the present time we do not regret it, as the study of physiological conditions of reproduction of viruses developed into physiology of viruses, and into the use of most delicate methods of research, including a method of tagged atoms; this did not leave any doubts, that the process of accumulation of viruses is not a process of autocatalysis of some fermenting substance, but represents a process of real assimilation of amino acids of purine

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

and pyrimidine elements and others more or less small molecules, out of which the virus builds its body. Researches have also established of late a presence of ontogenesis in viruses. There was no doubt left that the world of viruses is a world of special forms of life, diverse and more simple than protoplasts. I think that one of essential achievements of theoretical biology, issuing from the study of viruses, is the widening of our idea of life.

Studies of geographical distributions of viruses and of those connections into which viruses enter during the process of their circulation in nature brought us to conclusion that the idea of species is applicable to viruses. (Ryzhkov, 1942) To express ourselves concisely we will say: viruses enter into correlations with species of higher animals and plants, as well as of arthropoda on an equal footing, as a species with a species. At the proper time we compared the geographical expansion of pupation of grain crops which is met in the eastern part of Soviet Union and of mosaic disease, spread in the West. We showed then, that close forms of viruses of pupation and of mosaic disease of grain crops behave as representative species, which are well adapted to different ecologo-geographic conditions of territories occupied by them. It is possible to give many more instances of such representative species of viruses. Of late attention was drawn to the fact, that although the pathogen of yellow fever and of dengue Stegomyia is (Begin p. 799) spread everywhere in certain latitudes, nevertheless yellow fever is not found in the east of the 60th longitude and gives place here to dengue (May, 1952).

Thus viruses must become an object of systematics. This circumstance has a great theoretical and practical meaning. To make virus an object of

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

systematics in the same sense in which the animal and plant worlds are its objects, it means that viruses must be considered as products of historical development. Unhappily such a conception about the origin of viruses is not yet generally accepted. Many foreign scientists, and, unfortunately, some in the Union, are still thinking that viruses can be born in a macroorganism as a product of active life of this organism under abnormal conditions. It is self-evident, that if one accepts this latter idea, then one cannot speak about any taxonomic units of viruses, which, for instance, Luria in his textbook "General Virology" tries to prove (Luria, 1953).

With a deeper study of viruses there appears a substantial importance of their systematics for agricultural economy.

If viruses represent a product of metabolism of an organism which finds itself in unfavorable conditions, then the whole system of sanitary-hygienic measures becomes secondary in the control of viruses, and this brings about, for instance, a neglect of the factor of infectiousness of virus diseases in potatoes on the part of authors who treat these diseases as a result of degeneration (Favorov and Kotov, 1952). If viruses are a product of an evolutionary development, then the origin of viruses is always exogenous, and measures for their control must be directed to creation of conditions, which will arrest the spreading of virus infections.

Nobody ever proved a "spontaneous generation" of viruses. But others than these facts of negative order can be used to show that viruses appeared in an evolutionary manner. Engels, as we know it, was very interested in Pasteur's experiments, yet he understood well, that the idea about an impossibility of self-generation is based not only on these

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

experiments, but on the whole totality of facts. Engels thinks it inconceivable, that a drop of foul water in a short time will produce infusoria and other protozoa, which are a product of a historical process.(1) It goes without saying, that a conception of historical development of viruses not only does not bring us to an idea of eternal life, which Engels subjected to an exterminating critic, but it namely is the one which presumes an origin of life from inanimate matter in the process of evolution of the latter.

The fact that viruses are a product of evolution is seen from the species specificity of individual viruses shown under most diverse conditions, appearing in antigenic properties, in chemical composition, their morphological and physiological characteristics, and, finally, in those complicated connections into which viruses enter with different species of animals and plants, first of all with insects and ticks, which are vectors of many viruses. Such connections in all their specific exactness and complexity could have originated only historically. To think, for instance, that curling of potato leaves, which is transmitted by certain species of insects, or "stolbur" [a virus disease] in the potato family, Solanaceae, which is also spread by certain species of insects, originate every time anew - it means to believe in miracles. We know what meaning played the study of complex mutual adaptations of organisms in the formation of the evolutionary theory; (Begin p. 800) for instance, an arrangement between flowers and insects which provides for pollination. Every time, during studies of such arrangements, before

(1) F. Engels. Dialectics of nature. Gospolitizdat, 1952.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

the researcher arose a dilemma: what is it - a miracle or a historical process? And every time the materialistic science, quite naturally, repudiated the miracle and utilized the study of adaptation to develop the evolutionary theory.

In other works we already gave examples of viruses' adaptations for the circulation in nature; let us cite one more instance, borrowed from the newest literature (Broadbent, 1954). Cauliflower can be infected by various viruses. It is susceptive to the virus of black ring leaf spot of cabbage, as well as to the virus of the mosaic disease of cauliflower. Vectors of both these viruses are certain species of plant lice. Virus of the black ring leaf spot has a wider circle of hosts than the virus of mosaic, and achieves a much higher concentration in the leaves. However, when studying distribution of both virus diseases on plantations of cauliflower it appears that the mosaic virus has a much wider spreading under these same circumstances. This can be explained by the following. The virus of the mosaic concentrates, primarily, on the upper leaves of cauliflower, which are infected by aphids, and the virus of the ring spot is concentrated primarily on the lower leaves, which in this plant are very little subjected to aphid invasion. Thus, the mosaic virus has more chances for spreading among the plants of cauliflower. Virus of the ring spot is more adapted to spreading among typical forms of cabbage as it concentrates in the lower leaves, and in the given case exactly these leaves are preeminently populated by aphids. It goes without saying, that similar adaptations of two different viruses, from among which one infects primarily typical forms of cabbage, and the other - cauliflower could only be built historically (Broadbent, 1954).

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Development of a virus system not only presents a vast material for the proof of evolutionary origin of viruses, but also has a substantial importance in our practice for establishing related links among different viruses and helping to overcome a notion, harmful to our practice, about spontaneous generation of viruses.

A virologist feels very strongly the fairness of Linnaeus' statement, that without a name there is no knowledge. A correct identification of virus species is a most needed condition in problems of control of virus diseases. The latest literature is rich in information that apparently quite different virus diseases in reality are caused by one and the same virus. Yellow spot of pineapple, known in tropical lands, and a virus disease of tomato "bronzovost" [becoming of bronze color] is caused by one and the same virus. Yellow dwarfness of tobacco passes over to tobacco plantations from fields planted to alfalfa. Certain virus diseases of peaches are able to infect tomatoes also. Ring mosaic of currants is caused by a virus, which also is a pathogen of ring spot of tobacco. Certain strains of viruses, causing cucumber mosaic, can also produce diseases of fruit trees, and so on. On the other hand practice very often comes into contact with more or less related viruses, causing similar symptoms, yet, which, in reality, are quite different viruses, having different hosts and different vectors: such is, for instance, a large family of "Stolburopodobnikh" [stolbur-like] viruses. (Begin p. 801)

The practical importance of correct identification, as well as differentiation of viruses cannot be disputed. A problem of species of viruses becomes in practice a very important problem. At one time it was developed by us rather in detail (Ryzhkov, 1947), and we would not be mentioning it here if of late there was no tendency to somewhat simplify the ideas in this

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

field.

A phenomenon of interference is well known in viruses, consisting of the fact that closely related strains, and sometimes species are excluding each other during infection, in consequence of which the mixed infection by such viruses becomes difficultly realizable or impracticable. There was an attempt made to uphold T.D. Lysenko's (1950) idea about species with the aid of facts relating to virus interference. K.S. Sukhov (1953) writes: "Solution of the problem about taxonomy of viruses is impossible without a concrete revision of ideas about species and variants. Only now, as a result of the new light which this problem received in the works of T.D. Lysenko (1950) we can try to solve this problem with certain reasons." Further on Lysenko's thesis is cited about a qualitative difference of intraspecific relationships from interspecies and then the author makes a conclusion: "Interrelations among related strains of viruses, described in literature and studied by us in the process of experimental work, as a rule, present themselves as antagonistical interspecies relations. Basing oneself on this characteristic, it is possible to conclude, that the greater part of cited strains of viruses must be referred to qualitatively different species' forms" (page 5). From the given citations it is seen that the author's train of thought is purely dogmatic. He does not make any attempt to analyze, on the basis of the whole combination of properties, the criteria of species in viruses, but mechanically utilizes the interference of viruses as a sole criterium of the species, accepting T.D. Lysenko's ideas as infallible. The very attempt to prove the applicability of ideas about interspecies antagonism to viruses has a character of a logical error, known under the name of a vicious circle, because appurtenance

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

to various species is established according to the property of antagonism, and after this makes a conclusion, that the rule of antagonism can also be adapted to viruses.

V.M. Zhdanov (1953) also thinks that "Doctrine of Michurin's biology about a species is generalized in one of Lysenko's last works, where a difference is underlined in intraspecific relations (synergism) from interspecific (antagonism), which appears to be one of the most important criteria for a distinction of specific forms from varieties. The fairness of these ideas is clearly seen on the example of viruses" (pp. 36-37).

Utilization of the above cited T.D. Lysenko's ideas about the problem of species in viruses proved to be purely dogmatic. Treatment of interference as interspecific relationship is bound with very great difficulties from a virological point of view. Viruses of most diverse degrees of relationship are interfering among themselves; one can become easily convinced of this fact when looking at the table given in the "General Virology" by Luria (1953, p. 286). Sometimes the question is about interference between species which are very far removed from each other, as for instance, viruses of rabies and of foot and mouth disease; in other cases interference is between strains of one and the same virus, in a third case - different species of viruses, which are close to each other, such as grippe A and B. The same concerns viruses, which are pathogenic to plants. Many of the derivatives of tobacco mosaic disease virus interfers with its typical strain; they are constantly being generated under laboratory conditions, but in nature are so close to it, that we only can distinguish them almost exclusively by (Begin p. 802) different symptoms which are produced by these derivatives. On the other hand the virus of hothouse

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

cucumber mosaic (Cucumis virus 2), which differs quite considerably from the virus of tobacco mosaic as in the chemical composition, so also in hosts, which it infects, also interfers with the typical strain. If in the latter case we have to do with two species of the same genus (Virothrix Ivanovskii and V. cucumeris), then the derivatives, cited above, cannot in any way be taken as different species: they differ only slightly from the initial virus and generate under the same conditions of the experiment, whereas the cited species could not yet be obtained experimentally. They, undoubtedly, arose by way of gradual adaptation to different hosts, as, notwithstanding a great similarity of these viruses, virus of cucumber mosaic does not infect tobacco, and the virus of tobacco mosaic does not infect cucumbers. Cases are described when related strains do not interfere between themselves, or when they interfere on one host and not on another (Bennett, 1953). Different strains and different species of grippe virus interfere with each other, but so will also interfere the virus of grippe, which was killed by ultra-violet rays. It is doubtful that the cited authors will go so far as to call this latter one a new species of grippe virus.

In connection with the idea of virus species one wants also to protest against putting a sign of equality between species of viruses, which are found in nature, and their strains, which are generated under experimental conditions (Zhdanov, 1953). Even in those cases, when these latter ones have differences of an order of interspecific differences, they lack a basic property of the species: a certain areal of distribution in nature. We do not doubt, in any measure, of a possibility by men to obtain forms which will differ from one another; but not before these forms "escape" to

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

freedom, and will go through that historical development, as result of which they take up their place in nature, they will remain, so to say, only "potential" species.

It goes without saying that virus species, as other forms of life, differ from each other by a whole combination of properties; a great importance of the ecologic-geographical characteristics of the species must be especially stressed. In this respect an idea, advanced by V.L. Komarov is quite applicable to virus species: "study of this morphological-geographical method brought me to the conclusion that in all debatable cases, when a morphological analysis does not give a full certainty in the independence of species, when it is not clear wether this is a variety or a species before us, the problem can be solved objectively, by determining if a plant fits the special areal or not by these or other characteristics" (Komarov, 1940, p. 60).

We tried to utilize this principle of Komarov's in difficult cases of virus identification; in particular it helped us to correctly determine the "stolbur"-like disease of kok-saghyz and of other species of plants as a separate species, different from "stolbur" (Ryzhkov, 1946). All conditions of circulation of this species in nature are different from stolbur's. It does not infect tomatoes, whereas tomato is a plant that suffers most from stolbur, and it is transported by another species of cicada, than is stolbur. Difference between yellows of kok-saghyz and stolbur was later on recognized by the authors, who previously mixed up these diseases (Sukhov and Vovk, 1949).

There is a dispute, until the present time, among medics - virologists, some of whom consider certain forms of endemic encephalitis of men as an

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

infection by quite a special, peculiar virus, and others (Begin p. 803) identify it with Scotch encephalitis of sheep, which, for some unknown reason, began to infect people and mainly in a new geographical region. One should hope that this dispute will be resolved in favor of those who look upon this virus as an independent taxonomical unit (Zil'ber, 1945).

In other works we showed a good basis for separating viruses into a special type Ivanovskya. Does this type of live beings belong to the animal or the plant world? I think that it would be very hard to answer this question. We encounter this difficulty in asking the question for much higher organized forms of life, for instance, to flagellata. Even if one considers probable that the world of viruses is quite unique and different from animals and plants, even then the help of botanists and zoologists in virus systematics should be very much appreciated. A virologist, even if he has perfect knowledge of his special material, he yet does not have any experience in systematics. May be this will explain why among virologists there is yet a prejudice to give systematic value to th traditional division of viruses as viruses of animals, viruses of higher plants and viruses of bacteria. No consequences of taxinomical character issue from the fact that individual scientists are studying viruses having medical, veterinary or phytopatalogical importance. It will not enter anybody's head, for instance, to separate actinomyces, which infect a man's jaw, into another class from actinomyces which cause a disease of potato tubers, for the sole reason that they infect such dissimilar objects. Reasons against classifying viruses by their hosts were given by me repeatedly, yet the best reasons are offered by the advocators of this classification. It is four years now that we cannot get from them any characteristics, which would permit to discern animal viruses from plant viruses, besides

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

the fact that these viruses infect different objects.

Emptiness of the idea of animal viruses, as a systematic unit, is quite evident. Thus Zhdanov in his book, with a title, which does not fit its contents, "Nomenclature of Viruses of Men and Animals" gives the following "diagnosis" of the animal virus class: "Primary parasites of animals. General characteristic of the class corresponds to a characteristic of the type" (Zhdanov, 1953, p. 148). Consequently, representatives of the cited class do not have any other general characteristics besides the one that they infect animals, and even then with a reservation that they must be primary. As no criteria for this primary state is given it, obviously, must be some kind of insurance in case of need for a retreat. The editorial staff of the "Microbiology" journal also could not show by which taxonomic characteristics the systematic categories, of viruses of animals, higher plants or bacteria, which it tried to take under its protection, differ. This is what they write in the editorial article about the matter: "It seems to us, that at the present stage of our knowledge about viruses this subdivision is expedient, it is especially important from a practical point of view. Study of viruses must positively be linked with studies of conditions of their life within the organism of the host. The closer is this bond, the more fruitful will the result be" (About a discussion...., 1954, p. 201-202). It seems that the meaning of the argument, included in the last sentence, is clear only to the editorial staff of "Microbiology". Concerning the argument about practical value, it cannot be accepted, because in science only that has the most practical value which suits objective reality most, concerning the adequacy of classification (Begin p. 604) of viruses according to a "place of habitation" doubts are apparently present

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

even in the minds of authors of the editorial article because they accompany their declaration with several reservations, for instance: "at the given stage of our knowledge", or "nevertheless, one should not forget a certain limitation of this subdivision" (p. 202).

It stands to reason, that together with other properties, the specific characteristics of the parasite's host sometimes acquire an important meaning in a taxonomic diagnosis for the parasite itself. Thus, ascomycetes, belonging to the order Laboulbeniales, infect insects, exclusively, and for the most part, the beetles. This is characteristic for them; yet they are subdivided into a special order not so much according to this cause, but because they have a whole combination of other common properties; for instance, their constitution is characterized by an absence of hyphae and by formation of true tissues. Animal viruses do not have such common, for them all, characteristics, that is why they do not compose a separate class. Nevertheless, among viruses are to be met natural groups which are characterized not only by a community of constitution and of chemical composition, but also by a habitation in certain hosts. To these groups belong viruses which produce polyhedral diseases in insects. We separated them into a Pseudocrystallinae class. Undoubtedly this division was done not because they assail insects, but because for them it is characteristic to form polyhedrons and capsules into which are included virus particles, containing thymonucleinic acid in their composition. The fact that these viruses infect insects, preferably lepidoptera, together with their characteristic traits in the chemical composition are very important for separating them into a separate taxonomic unit, which reflects a special stage of evolution. Certain viruses, which assail insects, are yet not sufficiently studied and are included into this class without sufficient

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

basis (bag-like disease of bees). Viruses which strike at bacteria also compose a natural group (phages), but not only because they are bacteria and actinomycetes' parasites, but also according to many other characteristics. Many of these viruses have a peculiar constitution, they are composed of a small head and an extension. They are rich in thymonucleinic acid, they have common physiological peculiarities, and so on. These viruses were referred by us to the Gamaleyae class. But far from all viruses, which assail bacteria, are to be included without fail into this class, and we know at least one virus, a bacteria parasite, which belongs to another class (one which forms crystalline impurities, the parasite Cristispira balbiani). The class Chlamydozoa incorporates large viruses. Many of the representatives of this class can be seen through the light microscope. Species of viruses, which belong to this class have a large number of common properties; among these all of them contain in their composition lipoids and thymonucleinic acid, consequently, in chemical composition they approach protoplasts. At the present time representatives of this class, which parasitize plants are not known with certainty. It is possible that to them belong viruses of the mosaic disease of onion during which were found large impurities, which resemble elementary corpuscles.

The above cited classes are virtually accepted, in one or another form, by all systematicists of viruses, and apparently are quite natural.

Fucrystallinae class includes viruses which affect plants, as well as animals. Representatives of this class which are well studied are - virus of tobacco mosaic disease, virus of cucumber mosaic and others. Somewhat worse known are the representatives of this class (Begin p. 805) pathogenic to animals - virus of the foot and mouth disease, virus of poliomyelitis,

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

and others. All viruses included here are minute, do not contain any lipoids or thymonucleinic acids, for many of them a crystalline constitution was established, as well as the ability to form crystalline and paracrystalline aggregates. Viruses included herein spread without participation of insect-vectors, or the insects transfer them more or less mechanically.

Those who do not recognize our joining of animal and plant viruses must recognize two parallel groups in animals and plants. Genus Marmor of Kholms incorporates a greater part of viruses which we referred to Eucrystalline from the number of phytopathogenic viruses. In his last works, V.M. Zhdanov follows us and joins viruses of poliomyelitis group into one order with the pathogen of the foot and mouth disease. Order Protovirales of this author now includes viruses pathogenic to animals, which we refer to Eucrystalline class. Consequently our bringing together of these viruses yet in 1950 is now recognized also by V.M. Zhdanov (1953).

Class Arthropodophilae includes viruses which are pathogenic to both animals and plants. These are minute viruses, not yet much investigated in chemical composition. Those representatives of this class, which were separated in a pure form, contain lipoids and yeast nucleinic acid. All species included here are distributed with the aid of arthropoda, and a close bond exists between the arthropoda and the viruses. Propagation of viruses within arthropoda was ascertained in many cases, as well as the "transvarial'naia" [transvariant?] transmission of the virus. From among viruses which are pathogenic to animals and men, here pertain pathogens of yellow fever, dengue, mosquito fever, hemorrhagic fevers, tick, Japanese and other transmissive encephalitises. From among viruses pathogenic to

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

the plants, to this class belong pathogens of yellows, transfered by cicada, pathogen of "bronzovost'", which is spread by thrips, and other viruses. The class was established by us in 1950 (Ryzhkov, 1950). Every year brings new and more new reasons for its naturalness. Of late it was established, for instance, that the pathogen of yellow fever is serologically related to some of transmissive encephalitises (Sabin, 1953). It is understandable therefore that in one or another form the class Arthropodophilae begins to find recognition in literature. Thus Seibi writes: "I would like to start with an acknowledgement, that all the viruses of animals, which are distributed by arthropods, belong to one family" (Sabin, 1953, p. 580). V.M. Zhdanov, who formerly was very far from such ideas, has now acknowledged relationship of all viruses pathogenic to animals, which we incorporated in the Arthropodopilae class, and he separated them into the order Arthropodophiliales.

Thus, we see that in a short time to a considerable degree success was achieved in a unity of opinion among virologists, concerning the largest units in the systematics of viruses. This proves the naturalness of classified categories.

Diagnoses of virus classes are given by us elsewhere, as well as their subdivision into orders and families.

Individual classes are brought out on a basis of a whole combination of properties. As seen from cited instances, into a characteristic of a class enter peculiarities of the chemical composition, size of fragments, their constitution, as well as ecological relations. Sometimes we were rebuked that we give too great an importance to chemical properties; nevertheless in the given case the question is about properties, which

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

characterize a whole stage of evolution. As a matter of fact, all protoplasts in their composition (Begin p. 806) contain lipoids. An indication of absence of lipoids in the composition of certain viruses reveals the fact that in their constitution they are simpler than any protoplasts. Thymonucleinic acid in higher organisms is centered in the nucleus ["iadro"]. Absence of this acid in the composition of a virus indicates an absence in it of any kind of nuclear substance. Exactly these chemical properties, which are of basic importance, are taken into consideration in our system. It is important to note, that viruses, which are alike in many properties and which are brought together into one class on the basis of these properties, show also a great likeness in relation to such biological peculiarities as modes of circulation in nature. This makes the whole system extremely actual in a practical respect. Let us compare, for instance, large viruses, which contain lipoids and thymonucleinic acid, belonging to the Chlamydozoa class to which belong viruses of smallpox, grippe and many others, with minute viruses containing yeast nucleinic acid of the Arthropodophilae class. The first are very seldom transported with the aid of arthropoda and do not have any organic bond with these latter ones, the second class is almost exclusively distributed with the aid of these latter ones. The first ones are met mainly in men's habitations or near them and infect either men, animals or commensals of men. The second ones are inhabitants of forests, steppes; they are developed in wild rodents, in wild birds and wild plants. Representatives of the Chlamydozoa class are distinguished by a greater specialization. Smallpox in men, smallpox in horses, smallpox in cows and smallpox in swine - these are different diseases in spite of a great similarity of

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

viruses. Smallpox of birds is not contagious to mammals. Viruses of the class Arthropodophilae are mostly very little specialized and a wild bird in the presence of ticks can bring to men the taiga encephalitis.

When a man goes into a taiga (Siberian forest) he has no reason to think that he will be attacked by viruses, belonging to the Chlamydozoa class; yet he must take care to protect himself from Arthropodophilae. When waste lands are being brought under cultivation, we are quite confident that the cultivated plants, sown there, will not become victims of viruses of cucumber and tobacco mosaics, and other representatives of Eucrystallinae, which like Chlamydozoa, remain near men's habitations and are preserved in weeds; yet we have a right to await an attack on our newly cultivated lands of different kinds of yellows, which can be retained in wild plants.

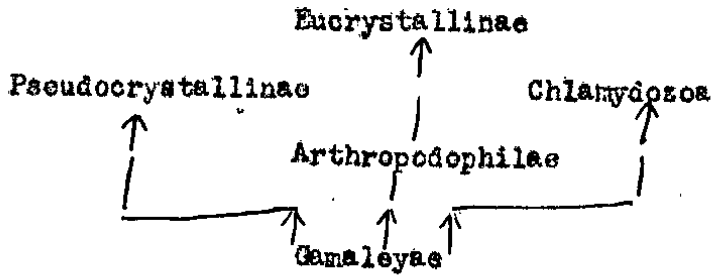
We already have thrown light, as far as possible, on the question of comparative antiquity of different classes of viruses. Gamaleyae is a parasite on bacteria. Judging according to their adaptability to these lower plants, one can assume a great antiquity of these viruses. Certain peculiarities of their parasitism speak in favor of this antiquity. They, at least partly, retain one peculiarity of a primitive parasite, they do not wholly enter into the cell of the bacterium, but sit on its surface. They can lyse not only live, but under certain circumstances, also dead bacteria, and are, apparently, comparatively complex in their composition. Thus, besides thymonucleinic acid they contain perhaps but traces of yeast nucleinic acid. Probably their free living forebears were somewhat more complex in their chemical composition and richer in enzyme systems. Great antiquity of Arthropodophilae issues even from the fact, that some viruses

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

belonging here are transmitted by both ticks and mosquitoes. They arose, probably, before the differentiation of individual classes of arthropoda. A geographical spreading of these viruses also speaks in favor of their great antiquity. Stolbur - like (Begin p. 807) diseases of tomatoes are to be found in Eurasia, Australia and in America. As these diseases are transfered by cicada, which are not mobile comparatively, and cannot be transfered through sap, one should think that they originated yet before Australia was separated from the continent. Eucrystallinae are of a comparatively later origin. The works of Holmes (1951) established, with some certainty, the center of origin of tobacco mosaic disease - in America. There are certain bonds between Arthropodophilae and Eucrystallinae. Apparently the latter ones originated in the Arthropodophilae class, and gradually emancipated from the carriers. Chlamydozoa stand apart from this line of evolution. Certain representatives of this class assail lower vertebrates (smallpox of carps).

Viruses' genealogical tree at the present time can be built only very hypothetically. If one supposes that all viruses originated from bacterial viruses, then this tree could be imagined like this:



One should pay attention to the fact that bacterial viruses are very closely bound to bacteria. Many bacteria live in symbiosis with anthropoda, within the cells of these latter. Other bacteria are parasites. Thus phages

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

enter the cells of higher animals and plants together with bacteria. The complicated correlations between phages and bacteria are developed in the cell of a higher organism. One should consider the latent phage-bearing ability of bacteria, as well as the secondary growth of bacteria after lysis, regeneration of bacteria from fragments, left after lysis, and so on. Were these processes not favorable to adaptation by individual bacterial viruses to the organism of higher plants and animals? One cannot also quite exclude a participation of symbiotic and parasitic bacteria in the formation of viruses. Unfortunately here we enter into the realm of pure hypotheses; but in connection with these hypotheses one should cite some precise experimental data, which were obtained of late. It turned out, that Corynebacterium diphtheriae always is a latent carrier of phage, and can produce only as much diphtheria as the phage carries it (Hewitt, 1952; Groman, 1953). Having freed itself from phage it becomes harmless. As soon as we recreate its bond with phage we again obtain a diphtherial rod. We stand, thus, before a puzzle which, one should think, will be made clear very soon: to what extent one or another parasitic bacteria has a pathogenicity, and to what extent this pathogenicity is induced by bacterial viruses.

Having risked to give a sketch of a genealogical tree we entered into the realm of pure phantasy. Yet did it not play its role in the formation of a family tree of the animal and plant worlds; is it possible to evade phantasy there, where proceeds a forward movement of science from the already known into the realm of the unknown, which is full of surprises?

To us it at least seems clear, that from two conceptions about the origin of viruses - metaphysical, antihistorical, (Begin p. 808) recognizing

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

self-generation of viruses, and the historical, evolutionary - only the evolutionary point of view can dependably guarantee the protection of human life, the protection of domestic animals and of agricultural plants from viruses.

LITERATURE

Zhdanov, V.M. (1953) Nomenclature of viruses in men and animals. M. - Zilber, L.A. (1954). Epidemic encepalitises. M. - About a discussion of a problem about non-cellular forms of life in microorganisms. (1954). Mikrobiologiia, 23, 2. - Komarov, V.L. (1940). Doctrine about species of plants. M. - Lysenko, T.D. (1950). Something new about biological species. Agrobiologia, 6. - Ryzhkov, V.L. (1938). Virus proteins and their importance for biology. Usp. sovrem. biolog., 9, 3. - Ryzhkov, V.L., (1942). A problem of evolution of ultra-viruses. Mikrobiologiia, 9, 4. - Ryzhkov, V.L. (1946). Phytopathogenic viruses. M. - Ryzhkov, V.L. (1947). Problem of a natural system of viruses. Jurnal obshch. biolog., 8, 3. - Ryzhkov, V.L. (1950). Experimental method of virus systematics. Vopr. medits. virusolog., 3. - Ryzhkov, V.L. (1952). Systematics of viruses in modern literature. Mikrobiologiia, 21, 4. - Sukhov, K.S. (1953). Formation of species of viruses. Izv. AN SSSR, ser. biolog., 3. - Sukhov, K.S. and A.M. Vovk. (1949). Stolbur of the potato family. M. - Favorov A.M. and A.P. Kotov. (1952). Summer planting of potatoes. M. - Andrewes, C.H. (1951). Viruses and Linnaeus. Acta Pathol. et Microbiol. Scandinavica 28, 3. - Andrewes, C.H. (1952) Classification and nomenclature of viruses. Ann. Rev. Microbiol., 6. - Andrewes, C.H. (1954). Nomenclature of viruses, Nature, 173, 4405. - Bennet, C.W. (1953) Interactions between Viruses and Virus-strains. Adv. of Virus Res., I. - Broadbent, L. (1954). The different distribution of

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

two brassica viruses in the plant and its influence on spread in the field. Ann. appl. biol., 41, 1. - Groman, N.B. (1953). The relation of bacteriophage to the change of Corynebacterium diphtheriae from avirulence to virulence. Science, 117. - Hewitt, L.F. (1952). Diphteria bacteriophages and their relation to the development of bacterial variants. Journ. gener. microbiol., 7, 3/4. - Holmes, F.O. (1939). Handbook of Phytopathogenic Viruses. Minneapolis - Holmes, F.O. (1951). Indications of a new-world origin of tobacco mosaic virus. Phytopath., 41,2. Luria S.E. (1953) General Virology. New York. - May, J.M. (1952). Map of the World distribution of Dengue and yellow fever. Geograph. Rev., 42,2. - Sabin, A.B. (1953). Relationships between Arthropod - borne viruses. Ann. New York Ac. Sc., 56, 3.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-754
(In full)
db/A

Chodrishwili, I.I.

Pervye itogi rabot po sozdaniiu gosudarstvennykh zashchitnykh lesnykh polos.

[First results of work for the establishment of State shelterbelts].

Les i Step', vol. 6, no. 2, pp. 7-17, Feb. 1955. 99.8 L565

(In Russian)

The Stalin plan for the transformation of nature in our country - an integral part of the majestic program of Communist construction - is being accomplished successfully. Equipped with the all-conquering Lenin-Stalin teaching, the Soviet people, relying on the achievements of science and practice, subjugate the forces of nature and place them at the service of man.

That which not very long ago appeared as a mere day-dream is becoming reality in our country.

With reference to the role of people in relation to objective processes which occur regardless of their will, tovarishch Stalin pointed out in his brilliant work "the Economic Problems of Socialism in the USSR" as follows: "Does it mean, for instance, that the results of acts of the law of nature and results of acts of the forces of nature are entirely inevitable, that the destructive acts of the forces of nature occur everywhere and always by

A 754

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

an implacable elemental force which does not submit to the influence of man? No, it does not mean that. Excluding astronomical, geological and some other analogous processes which man is actually incapable of influencing, even though he knew the laws of their development, there are many other cases in which man does not by far lack the power to exert his influence upon the processes of nature. In many such cases man, having learned the laws of nature, how to account for them and rely upon them, how to apply and utilize them skilfully, can limit the sphere of their influence, can turn the destructive forces of nature in another direction, can harness the destructive forces of nature for the good of society".

Among the majestic works which are transforming the face of Soviet earth, an important place is reserved for the establishment of shelter-belts. The task is set down in the directives of the 19th Party Conference dealing with the fifth five-year plan as follows: "To provide for the further expansion of shelter-belts in steppe and forest-steppe districts, for the accomplishment of agro-forestry improvement measures for the control of soil erosion and reforestation of sands, for the creation of forests of economic importance, green belts surrounding cities and industrial centers, along the banks of rivers, canals and water reservoirs. To establish in the course of the five-year plan no less than 2.6 million hectares of shelter-belt plantings on kolkhozes and sovkhozes, and about 2.5 million hectares of seedbeds and plantings of State forests".

Shelterbelt planting of the extent and at the rate it is done in our country is unknown in the history of world agriculture.

In his classic work "Anti-Dühring" F. Engels wrote: "Conditions of life which surround people and which thus far have dominated them are now coming under the power and control of people who for the first time are

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

becoming the actual and conscious masters of nature because they are becoming the masters of their social life. . .". Only in our country, the land of victorious socialism, the people are subjugating the elements and are transforming nature for the good of the nation, are becoming the masters of nature.

In capitalistic countries even limited plans for reforestation are failing. Thus, in the United States of America the project to create "tree shelters" burst like a soap bubble. In England there are more old trees cut down than new ones planted. [Begin p. 8].

No capitalistic State has ever thought of transforming nature. Capitalism means depletion of natural ~~riches~~ resources and merciless robbing of the working people. The principle aim of capitalists is unrestricted gain. Imperialists find it more advantageous to use their capital for the production of means of mass destruction of people, for their wars of pillage and banditry instead of using it for peaceful, constructive purposes.

In our country 2 million ha of forests were planted from 1949 till 1951 alone. The Ministry of Forestry of the USSR alone planted during this period 1038.2 thousand ha of tree plantings in the steppe and forest-steppe districts of the European part of the USSR, and in the spring of 1952 an additional 417 thousand hectare. To visualize more graphically the volume of reforestation accomplished in our country, it suffices to say that the forests to be created in the steppe and forest-steppe districts between the years of 1951-1955 will cover 50 thousand km^2, an area one-and-a-half times larger than the entire territory of Belgium, or equal to one fifth of the territory of England. Forest plantings allocated for the protection of kolkhoz and sovkhoz fields and for the wood supply to districts with insufficient forest lands and those bare of woods will exert their

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

influence over land extending tens of millions of hectares.

Thanks to the daily solicitude and the tremendous assistance which the Party and the Government give to those who transform nature, all the conditions needed for successful work have been created. In the past four years over 360 shelterbelt stations have been organized and equipped with the latest technics - with tens of thousands of powerful tractors, with tree planting and tree sowing machines, with plows, cultivators, bulldozers, graders and other complicated machines and mechanisms. Prominent specialists with much industrial experience have been sent to forest shelterbelt stations. Our agrobiological science, which is the most advanced in the world and the achievements of which have laid the foundation for the technics of shelterbelt planting, has been of great help to the foresters. Finally, the decisive condition for the successful fulfilment of Government tasks is the unprecedented patriotic uplift, the enthusiasm of the Soviet people, particularly of the youth, the socialist competition between kolkhozniks and the workers of LZS [shelterbelt stations], MTS [Machine-tractor stations], forest farms and sovkhozes.

Among the different categories of forest plantings - shelterbelts, near gullies, on sands, and others - the State shelterbelts stand out in particular. Eight State shelterbelts with a total expanse of 5.5 thousand km cut through steppes and semiarid country in various places. They either stretch along the banks of the largest rivers - the Ural, Volga, Don and the Northern Donets, or on water divides between the rivers, covering commanding heights over wide plains and fields. The State tree belts serve as a support of shelterbelt plantings which fringe the fields of kolkhozes and sovkhozes. Together with these, they will keep out dry winds, will change the water regime of the soil, will create in the surface layer

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

new climatic conditions more favorable for the development of agricultural crops.

In the past four years, on all eight State routes, trees have been sown and planted on almost 60% of the territory subject to reforestation. Creation of State tree belts at such a rate shows that forestry workers are fulfilling successfully the commitments which they took upon themselves before tovarishch Stalin with regard to pre-term accomplishment of the plan determined by the Party and the Government.

Planting of State shelterbelts is almost completely finished in the direction of Kamyshin--Stalingrad and Belgorod--Don River. The little unfinished business left will be completed this spring. [Begin p. 10].

Young forests - the future green guard of our fields - are already stretching over an expanse of 250 km on the approaches to the Volga in the Stalingrad Region, and over more than 700 km along the banks of the Northern Donets River in the Kursk, Kharkov, Stalinsk, Voroshilovgrad and Rostov Regions.

Work for the establishment of one of the largest water dividing tree belts, Penza - Ekaterinovka - Kamensk, is progressing successfully. Here almost 600 km, or about 80% of the area subject to reforestation is already occupied by woods.

Work on the tree belt, Voronezh - Rostov-on-the-Don, one of the largest in expanse is nearing completion. It is more than 1000 km long and about 70% of the plantings designated in the plan have already been planted. In the past year of 1952, the Voronezh group completed most of the planting on their half of the belt which extended over 300 km.

More than half of the area assigned to reforestation has been seeded and planted on the State belts of Saratov - Astrakhan and Chapaevsk -

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Vladimirovka, the southern tips of which are situated in chestnut soils unfavorable to tree growing. Reforestation work on the State tree belts of Stalingrad - Stepnoi - Cherkessk and gora [mountain] Vishnevaia - Chkalov - Ural'sk - Caspian Sea was begun later than on other belts, but it is already more than one third finished.

Forests are planted on a vast territory under various natural conditions and largely in areas where no forest had grown heretofore, where the people had neither the skill nor the experience in forest culture. The Soviet people are dealing with this new task meritoriously and are promoting from their own midst excellent workers, leading innovators and active participants of Communist construction.

This is demonstrated by many convincing examples.

The gora Vishevaia - Chkalov - Ural'sk - Caspian Sea State belt runs through districts where forest growing is made most difficult by heavy, largely saline soils, with a sharp continental climate, where hot dry winds are characteristic in the summer and very low temperatures in the winter. Work on this belt is conducted, among others, by the Ilek Shelter-belt Station. A cooperative, stable body of workers [Kollektiv] of this station, headed by Director tovarishch Kuzin and the senior forester tovarishch Khvostov, deals successfully with the task imposed upon it.

The success of this station can be explained by the well organized, strong working discipline. [Begin p. 12]. Here everybody shows an interest in the plantings - the director, the group of workers, the office clerk and the stable boy.

The 160 ha of forest planted by the Ilek Shelter-Belt Station in the fall of 1950 and in the spring of 1951 showed in last year's fall inventory an

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

increment of 85%. Saplings of the fine-leaf [melkolistnyi] elm and of ash produced an increment of 80-100 cm. The workers of the shelter belt station used the clean fallow system with a plowing depth of no less than 30-35 cm when they prepared the soil for tree planting. Careful marking ensured strictly straight lines and a parallel arrangement of the rows which reduced the need for treating these plantings by hand to a minimum and made mechanized tending in interrows with KUTS-2.8 cultivators possible. At this station, an average of no less than 75% of the entire work, involving the care of trees, was carried out by machine.

In the spring of 1952 the Ilek Shelter-Belt Station successfully accomplished seeding and planting of trees on an area of 815 ha, surpassing plan requirements. Work on the first industrial section was excellently organized (foreman, tovarishch Goncharov). The group of workers on this section were the initiators of socialist competition among the workers of shelterbelt stations to compete for the right to call themselves the section of excellent caliber. Tree planting on tovarishch Goncharov's section was finished in 6 work-days, and the first tending was carried out by the 10th of May. Good ~~Sanitarie~~ indicators in soil treatment and tree nursing were attained by the female tractor operator F. Pobirukhina and the trailer operator, [pritsepshchitsa] N. Zaikina. During the spring, while working on the tractor U-2, they developed 113 ha of soft plowland without injuring any tree. Tree teams which do good work are those of Evdokiia Ereminaia, Mariia Piskunova and Anna Shul'ga. Weeding in rows, tree attendants daily surpassed their quotas by one-and-a-half to two times.

The Anotaev Shelterbelt Station (Director, tovarishch Antonov) is working under very difficult conditions on the Saratov-Astrakhan State

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

belt - on the brown soils of the right bank of the Volga, and the Kharabalinsk Shelterbelt Station (Director, tovarishch Filin) on the dry, sandy soils of the left bank. Here the average precipitation is even less. Many scientists have felt that here cultivation of forests, and of such dimensions at that, was impossible. The workers of these stations, however, have refuted the assertions that reforestation of semiarid country was impossible. Both stations have almost fully completed planting the State forest belt on the land assigned to them. Plantings of the principle species - fine-leaf elm, which were planted in the fall of 1949 and in the spring of 1950 have reached a height of 3-4 m. In these belts the chirping of birds, which never dwelled here before, can already be heard.

On the Kamyshin - Stalingrad State belt called "route of youth", excellent work is being done by the Kamyshin Shelterbelt Station (Director tovarishch Kazurov and Chief Forester tovarishch Poliakov). With the aid of the Stalingrad members of the Young Communist League, this Shelterbelt Station fulfilled its tree planting duties with the very best pointers [pokazateliami]. Particularly outstanding work was done by brigadier Mariia Charikova of the tree culture brigade, the tree cultivating worker, tovarishch Kuznetsova, the tractor operators Tarakanov, Loginov, Zadorozhnyi and others.

At the Balanda Shelterbelt Station (Saratov Region), on the Penza-Ekaterinovka - Kamensk State belt, excellent work is being done by senior mechanic tovarishch Kaluzhenin, the head of the first section tovarishch Krakhmalev, brigadier of the tractor brigade tovarishch Chuprykin, [Begin p. 14] tractor operators Nechepurnov, Kuliavtsev, Kiselev, Grekolov, and others, the tree cultivating workers Solodovnikova, Repina, Velikanova, Podgainova, Koliarenko, Kusukantova and many others.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The valuable experience of leading innovators and leading workers' groups should be studied carefully and adapted to production more rapidly. It is time to abolish delay in transmitting and adapting the best experience. The achievements of leading workers ought to become the property of all shelterbelt workers.

Side by side with the successful work done by leading workers's groups in the establishment of State shelterbelts, there have occurred serious errors in a number of places which, with the technical and economic possibilities of shelterbelt stations, can be explained only by the careless attitude of individual managers toward their work.

One of the main omissions is the violation of agrotechnics in the preparation of soil. Each shelterbelt station has all the prerequisites needed to prepare tree seedbeds and plantings in advance by using the system of clean fallow, to apply deep plowing and cultivate the soil in good time. However, on the Chepaevsk-Vladimirovka State belt within the limits of the Saratov Region this requirement is not being fulfilled. Violations of the agrotechnics of soil preparation have occurred in other places also, for instance, on the gora Vishnevaia - Chkalov - Ural'sk - Caspian Sea belt.

The most important condition in obtaining good plantings is the seeding of highgrade germinated acorns and the planting of well developed standard seedlings with a normally developed root system. Meanwhile, on the gora Vishnevaia - Chkalov - Ural'sk - Caspian Sea belt, within the limits of the Chkalov Region (the Pavlovsk - Burtinsk and Krasnokholmsk shelterbelt stations) and on the Chapaevsk - Vladimirovka belt in the Saratov Region, the managers of shelterbelt stations have failed to prevent gross violations of these requirements.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

It is known that tending forest plantings is a guarantee for a high increment and successful development of the plants. Nonetheless, the work of tending individual plots of State belts has been conducted unsatisfactorily. At the Engels shelterbelt station (Saratov Region) on the Saratov - Astrakhan belt, at the Pavlovsk station (Chkalov Region) on the gora Vishnevaia - Chkalov - Ural'sk - Caspian Sea belt, at the Kalachevsk and Serafimovich stations (Stalingrad Region) on the Voronezh - Rostov-on-the-Don belt and in a number of others, the forest plantings on a considerable area were badly overgrown with weeds as a result of late and insufficient care during the spring-summer period.

To develop rich woods it is required that nurseries grow an assortment of tree and shrub species which, together with oak under the given forest conditions, would produce biologically stable plantings. The nurseries, however, fail to provide a sufficient amount of seedlings of the assortment needed for planting.

A serious gap in our work is the lack of interest in the matter of tree seed. To provide seeding with acorns and with the seed of other tree species of local origin, it will be necessary to use precautionary measures so as to increase and to safeguard the yield of seed on specially assigned tree seed plots. Aircraft-chemical control of pests which are very noxious to acorns is particularly important. This method, however, has not been utilized sufficiently in the eastern and south-eastern regions where acorns had to be imported from more westerly districts of the country, which reduced the biological stability of the newly created forest plantings. In contrast, in the Stalingrad Region where aircraft-chemical control of forest pests was conducted on almost the entire area of fruit-bearing plantings, the abundant acorn yield gathered in 1961 sufficed

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

not only for the 1952 spring seeding in the Stalingrad Region, [Begin p. 17] but also for the other south-eastern regions.

Oak seedings and plantings have suffered and are suffering considerable damage caused by low temperatures. Complete or partial destruction of oak by frost occurs more often in places where sprouts and young oak saplings are not sheltered by agricultural crops with tall stems (primarily maize), or by permanent rows [kulisa] of fast-growing trees or shrubs which have to be established a year or two before acorns are planted. Destruction of yearling oaks by frost is noted on considerable stretches on the State belt of gora Vishnevaia - Chkalov - Ural'sk - Caspian Sea and on the Chapaevsk - Vladimirovka belt. Partial injury by frost is noted also in the more westerly districts, particularly on the State belts of Penza - Ekaterinovka - Kamensk, Saratov - Astrakhan and Kamyshin - Stalingrad. Many shelterbelt stations, however, underestimate the great importance of permanent strips of fast-growing tree species and fail to carry out instructions of technical projects and of the active instruction.

The year 1953 will be the fifth year of fulfilling Stalin's plan of the transformation of nature. To complete successfully and to continue the work of creating State tree belts, it is essential that a series of urgent measures be carried out by the spring of 1953.

During the winter it is necessary, first of all, to provide good storage for acorns prepared for spring seeding. Standard seedlings of tree and shrub species specified by the technical projects which deal with the creation of State belts should be selected for planting and they should be preserved properly in a winter storehouse until they are utilized in the spring.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

By spring, nurseries should have prepared the seed of the most valuable tree species designated as the principal ones for State tree belts. Special attention should be paid to the cultivation of soil conservation shrubs such as the smoke tree (in districts where it survives frost), and of berry shrubs - the June berry, gold currant and others. To introduce a large number of bentleaf Norway maple [klen ostrolistnyi], pears and the Tatarian maple into oak plantings, it will be necessary to expand the seeding of these accompanying species of oak in the nurseries in every way possible.

An effort will have to be made to fill in thinned out timber crops until the established standard number for plants is reached, in order to attain joining of the young plantings as rapidly as possible; this is a serious task of shelterbelt stations and tree farms on State belts.

It is necessary to ensure snow retention on shelterbelts during the entire winter. This is most important for the greatest possible moisture accumulation in the soil and also for the protection of one-year old oaklets against destruction and partial injury by frost. Snow retention must be accomplished on oak seedings of past years as well as on areas prepared for future plantings.

During the past four years we have accumulated much experience in growing forests on steppes. This fact makes us confident that all work to be done in 1953 will be accomplished in time and on a high agrotechnical level.

The Stalin plan for the transformation of nature inspires the workers who grow shelterbelts to strive for new successes in their noble work. Inspired by the decisions of the 19th conference of the Communist party and by the historic speech of the beloved leader and teacher, Iosif Vissarionovich Stalin, an army of many thousands of workers engaged in

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

agro-forest improvement will make every effort to accomplish the responsible tasks facing them.

[Tr. note: Article is illustrated with photos of shelter-belts and of outstanding workers].

Upravlenie Poletashchitnogo
Lesorazvedeniia pri Sovete
Ministrov SSSR

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-755
(Abstract)
db/M

Pis'mennyi, N. R.:

Soveshchanie po polezashchitnomu lesorazvedeniiu.

[Conference on tree planting for shelterbelts].

Pochvovedenie, no. 2, p. 94-96, Feb. 1955. 57.6 P34

(In Russian)

V. Ia. Koldanov, a deputy chief of the Main Administration of Forest Industry and Shelterbelt Plantings of Department of Agriculture of USSR, gave a report on what was accomplished and what measures are being taken for the progress in shelterbelt plantings.

P. D. Nikitin spoke about results of experiments for utilizing different methods for growing shelterbelts in steppe and forest-steppe regions in USSR. He is the director of the All-Union Scientific-Research Institute of Agro-forestmalioration.

The Conference was given data of results of accounts taken by the Department of Agriculture in July-August, 1954, on the influence of shelterbelts on the increase in yields of grain crops.

In 550 cases out of 575 increases of differing amounts were found. According to data received from 376 sections, it was estimated that, the increase of yield in the zone of shelterbelts' influence was: up to 1 c per ha in 174 cases, from 2 to 3 c in 155 cases, from 4 to 5 c in 37 cases, and over 5 c per ha in 30 cases.

A 755

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Narrow shelterbelts were found to be the most effective. On fertile, average and southern chernozems - 10 to 15 m in width, on chestnut soils up to 20 m. It was recommended that they should be kept up in a way so that the air can blow through the lower part, and resemble an open-work in the upper part. In some kolkhozes, where no felling or pruning of trees was done, according to instructions for the care of shelterbelts, negative results were had from these plantings. Large snow drifts formed, melting of snow was very prolonged and it retarded the spring work in the fields, causing uneven ripening of grain crops.

Many of the speakers reported that a 3-4% decrease of planting area used for shelterbelts repays very handsomely in increased yields on fields which are surrounded with shelterbelts. Especially is this true during dry years.

Only 2% of all agricultural work performed is spent for establishing shelterbelts in kolkhozes.

A.G. Gael' (Forestry Institute of the Academy of Science of the USSR) has pointed to the need of better use of sandy and sandy-loam soils. In Groznenskoi oblast', where 100 thousand ha of virgin lands, of which 40 thousand ha are light sand and sandy loam soils, were brought under cultivation. As a result of this 1/3 of these soils, which before plowing had a good stand of grass, turned into sands and could not be used for plowing; the remaining land gave very poor crops. A.G. Gael' recommended the use of light soils, which are subject to weathering, for grazing, vineyards and orchards. For agricultural uses he recommended strip plowing (strips of 20-25 m in width) and coulisse fallows (a fallow which is planted in strips to corn and sunflowers). Good results were obtained using plows without

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

moldboards according to T.S. Mal'tsev's method. The net of shelterbelts on sandy loam soils of the steppe zone must be denser.

A.V. Bal'chugov, chief of a silviculture laboratory of the Siberian Scientific-Research Agricultural Institute, on the basis of his 50 years experience of tree planting in Western Siberia recommended a wider use of birch, larch, and pine trees.

L.D. Shliakhanov spoke about positive results in afforestation of Lower-Dnepr sands according to peat-hill method which was recommended by the Silviculture Institute of AN SSSR.

An interesting report was given by L.D. Armand (Geography Institute of AN SSSR). He pointed out that it is especially important to plant wide waterabsorbing forest strips across slopes in places where a run-off had not yet become concentrated in a ravine (in the middle of the slopes or at the upper limit of washed off soils). He also gave valuable recommendations on placing shelterbelts according to the character of topography and of agricultural uses of the territory.

Professor N.G. Godunov spoke about the necessity of improving water conditions in the soil to a depth of 1-1.5 m for a successful silviculture on chestnut soils.

A.N. Zevakhin spoke about an experiment on chestnut soil utilizing deep furrowing with a plow without moldboard.

Several members of the Conference spoke about the failures in methods of steppe silviculture, which were recommended by Academician T.D. Lysenko, namely - elimination of a special preparation of the soil, general use of oak plantings under the cover of agricultural crops, planting of bushes, and underestimation of care for crops and tree plantings.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The conference recommended to the Department of Agriculture of the USSR the following:

to develop tree plantings for shelterbelts chiefly in regions of chernozems and chestnut soils; to strive for the creation of a system of shelterbelts, that is for concentrated afforestations around plowed lands, gullies, ravines, sands; to study the problem of shelterbelt plantings in regions of virgin and waste lands;

in the next few years to give attention to restoration and upkeep of previously planted shelterbelts;

during the setting up of gully-ravine plantings in the next 3-5 years to concentrate on the afforestation of water-collecting headers and of slopes of active gullies, which are directly endangering farm lands and buildings;

work for the afforestation of large gully-ravine systems on the shores of the Volga, Don, Dnepr and other large rivers, around large reservoirs, as well as large tracts of sand;

in those regions with developed erosions which are subject to dust storms, do not limit the size of protected sections to 100 hectares, but establish them according to the conditions of the locality.

On a basis of experience of kolkhozes, leskhozes [forest farms] and of scientific establishments since 1949, productive plantings of oak acorns by a hill method were found to be unjustified, after having been studied under different economic and tree planting conditions. In connection with this the Conference refrained from recommending the hill planting of oaks according to the method of T.D. Lysenko as a basic method for oak cultivation.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

In order to grow shelterbelts, which will be able to protect the fields in the shortest time possible, the Conference recommended the planting on a wider basis of such fast growing species as birch, larch, poplars, in addition to oaks which are very valuable for this purpose. Also to introduce more freely into the shelterbelts fruit, berry and nut trees and bushes.

The Conference pointed to the necessity of intensification of scientific-research and construction works for the creation of machinery and impliments for mechanisation of shelterbelt plantings and care.

They also recommended that the material recompense to members of kolkhozes and other workers who cultivate shelterbelts be increased.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-756
(In full)
db/H

Korotkikh, G. I.

Aerozol'nyi metod borb'y s vrednymi nasekomymi i kleshchami.

[Aerosol method of control of harmful insects and ticks].

Vsesoiuznaia Akademiia Sel'skokhoziaistvennykh Nauk im. V.I. Lenina. Sektsiia Zashchity Rastenii. Trudy, no. 21, pp. 15-21. 1953. 464.9 Akl

(In Russian)

In 1949 at the Moscow Station of VIZR of the Ministry of Agriculture, USSR, there was organized an expedition for crop protection upon which was laid the testing of aerosol machines and aerosols for control of pests and diseases of plants for struggle with frost and other goals. The expedition for crop protection was and is at the present time the center for the organization of research and introduction into practice of new highly effective methods of applying liquid chemicals in agriculture and in allied fields of the national economy.

At the beginning of the work, the expedition laid out powerful aerosol machines of special designation. Their testing under conditions of agriculture were conducted according to the methods which are applied during investigations of spraying. This is explained by the fact that aerosol method of applying liquid chemicals is considered as only one of the methods of spraying (more complete), but the aerosol itself - is a simple mechanical mixture of small drops of chemical in air.

A 756

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

After a series of investigations and chiefly after the testing of the aerosol method in production conditions, this new method of application of liquid chemicals received other more correct evaluation.

The period of research from 1949 to 1951 may be divided into three stages: (1) research testing of aerosols (1949-1950), (2) making more exact the concepts about aerosols and basic agrotechnical demands of aerosol apparatus and machines (1950-1951), and (3) investigation of experimental apparatus and introduction into production of aerosol apparatus (1951).

The work in 1949 was characterized by a broad arrangement for testing of toxic aerosols in the control of harmful insects and ticks in conditions of citrus and tobacco plantations, fruit gardens, fruit orchards, green crop plantings, swimming areas, reservoirs, inhabited localities, and closed quarters.

Basic attention was given to the phenomena of the action of aerosols on insects, plants, animals and people. The action of aerosols was checked on coccidia of citrus crops, thrips on tobacco, leaf rollers and San Jose scale in young orchards also especially harmful eurygaster, flies, mosquitoes, bees, fish, gambusii, white mice and rabbits. Individual personnel which had been sprayed with aerosols, were placed under continuous medical observation.

The action of aerosols on the fundamental physiological processes of plants (photosynthesis and transpiration) was checked on citrus plantations.

On the basis of observations on the action of aerosols there was conducted treatment of the cities Sukhumi and Krasnodar with the aim of eradicating flies and mosquitoes.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Less attention was given to the study of the physical-chemical properties of aerosols and methods of their creation, although doing this there were utilized different methods of determining dispersity and concentration of aerosols, the quantity of percipitated chemicals, the quality of distribution on the surface and the disintegration of it from the action of high temperatures during the creation of aerosols and from the surrounding environment.

For the work and the study of the aerosol method, there was attracted specialists of different professions from twenty research organizations: engineers, chemists, physicists, toxicologists, agronomists, entomologists, zoologists, plant physiologists, meterologists, and medical doctors.

Thus, in 1949, there was clarified the basic positive and negative qualities of the aerosol method, the prospectives of practical application of aerosols, and the basic direction of further research.

The first stage of research was concluded with the construction of the automobile aerosol generator, AAG (V.F. Stepanov and G.I. Korotkikh) - as an apparatus for laboratory field research of the physical-chemical properties of aerosols and as a simple aerosol apparatus for treatment of small inclosed quarters.

In 1950, simultaneously with the continuation of prospecting work in the field for disclosing objects for application of aerosols there was produced an evaluation of the physical-chemical qualities of aerosols, classification of them according to object of application with consideration of the surrounding environment, development of basic agrotechnical demands for aerosol agricultural machines and apparatus and there was commenced the working out of new methods of research on the properties of aerosols.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The action of aerosols on the winged Asiatic locust, grasshopper, complex pests and diseases of fruit orchards, the peat miner moth, complex storage pests and external parasites of agricultural animals.

On the basis of these investigations there were conducted attempts to control warehouse pests and external parasites of agricultural animals in 74 kolkhozes in Moscow, Kirovograd, and Crimean Oblast and in Krasnodar krai, treatment with aerosols of the cities of Krasnodar and Simferopol from flies and of inhabited points of the Southern shores of the Crimea (from the settlement Simeiz up to the pioneer camp "Artek" inclusively, in this number also the city of Ialta)-from mosquitoes.

The number of research organizations which were attracted to the work with aerosols was reduced but the research work of the expedition was deepened. During the study of the physical-chemical properties of aerosols there were utilized modern measuring apparatus and methods.

As a result of generalization of the obtained materials there was conducted a classification of the possible cases of practical application of aerosol and in connection with this there were noted the basic agro-technical demands for physical-chemical properties of aerosols and methods of creating them, and also there was determined certain tentative parameters of aerosols. The basic agrotechnical demands for aerosols and aerosol machines are given in the table.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Requirement	Typical cases of aerosol application		
	Enclosed quarters	Open nature	
		Short-time action	Residual action
Degree of dispersion	High	Medium	Low
Limits of dispersion (diameter of the drop)	d< 3.0 microns	d = 5 ÷ 20 microns	d = 3 ÷ 50 microns
Character of dispersion	Iso-dispersion	Iso-dispersion	Poly-dispersion
Admissible deviation of dimension of drop diameter	Not admissible	± 20%	± 10%
Method of creation of aerosol	Thermic	Thermo-mechanical	Thermo-mechanical
Role of admixture to chemical	Only a solvent	Carrier and solvent	Carrier and solvent
Phytotoxicity of solution	Neutral	Weak	Excluded [iskliuchaetcia]
Limits of dosage of solution	5-20 ml/m^3	2-5 l/ha	5-15 l/ha
Odor of the solution	Disappearing	Neutral	Disappearing
Markost' of the solution	Excluded	Weak	Neutral
Consumption of solution per minute	1-4 l	4-6 l	6-10 l
Supply of solution (minimal)	100 l	200 l	300 l

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

In 1951, there was conducted work for the creation of methods of investigating the physical properties of aerosols (chiefly its dispersity). Doing this it was established that the usual of research which was utilized during spraying and dusting could not be extended to the evaluation of the aerosol state of liquid chemicals. The aerosol state of liquid chemicals is a result of the transformation of a quantity (in the given case the number of drops and the total surface of them) into a new quality; thus, the aerosol state is a qualitatively new state of liquefication. So, for example, it is known that all aerosols possess specific kinetic and optical properties which are first of all functions of the degree of their dispersity. Besides this, in aerosol clouds there arise a series of other phenomena which are specific for the aerosol state of liquefication (recondensation, peculiar conditions of evaporation, micro climate, electrophoresis and others). Especially complex and insufficiently studied are the physical-chemical states of toxic oil solutions in aerosols which are created by the thermic and thermomechanical methods (evaporation of solvent, nuclear condensation, toxicity, transfer of fog into smoke). Before science stands the task to in a future time uncover the essence of the physical-chemical phenomena which arise during the formation of aerosols from toxic solutions in order to proceed to a new scientific selection of toxicants and solvent carriers, and also to an understanding of the laws of creation of aerosols, and the dynamics of them in time and space.

The greatest achievement in 1951 was the creation of the experimental aerosol apparatus PAU-1 on the foundation of the "Moskvich" automobile engine, according to the design of Laureate of the Stalin Prize, S.I. Novikov, somewhat supplemented by Candidate of Technical Sciences V.F. Dunskii. This apparatus was counted on to create, under field conditions, aerosols by different methods and with different degrees of dispersion.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Changes in the degree of dispersion can be produced by altering the basic operational parameter of the apparatus (temperature of the gas, rate of its discharge, and input of air and liquids). In 1951 there was conducted a broad commercial testing of the aerosol method of control of warehouse pests and with external parasites of agricultural animals by means of treatment of closed quarters of kolkhozes with the aerosol generator AAG. The testing was conducted in the kolkhozes of the Ukrainian SSR, Krasnodar and Stavropol krais, the Moscow, Crimean, Kuibyshev and Rostov oblasts with the participation of local research organizations. The volume of the work in the Crimean Oblasts and Krasnodar krais, alone exceeded a million cubic meters. The testing confirmed the high technical and economic effectiveness of the aerosol method, and the simplicity and cheapness of the apparatus AAG. As a result of commercial testing there were introduced certain changes in the construction of the apparatus for mass production of them, the techniques and tactics of their application were made more exact, which will open the possibility of an increase in the technical-economical index with the retention of the simplicity of construction. For the obtaining of aerosol there was utilized a solution of technical toxachlorane in diesel fuel, solar and green oil and in kerosene. The best results in the action of the aerosol on warehouse pests (warehouse and rice weevils, the meal beetle and mealy mites and others) were received from the application of a 15% solution of hexachlorane in green oil at a dosage of 5 to 20 milliliters per cubic meter.

In the control of external parasites of agricultural animals the best effect was obtained from the application of a combined solution of technical DDT and hexachlorane at a dose of 20 to 40 milliliters per cubic meter.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The indicated composition of the aerosol fatally acts on lice, vlasoedov, bird lice, flies, mosquitoes, ikxodovykh, persian lice and others. Practice showed that the aerosol method is successful in replacing such work as the manual treatment of cattle, bathing of animals and moist disinfection, sharply reducing labor input and consumption of materials in conducting sanitary measures.

The apparatus AAG was introduced into the design of the automobile disinfection apparatus DUK Komarov (on the base of the automobile GAZ-51), of which in 1951, 101 were released and in 1952-nearly 200 models.

In spite of the fact that the speed of difusion of an aerosol in air is significantly greater than in any liquid, in all cases of applying a low powered apparatus in conditions of large quarters it is practically impossible to obtain a sufficiently equal treatment of all services of a polydispersion character of the aerosol which is created by the thermic and thermo-mechanical methods. There exists a certain dependence between the volume of the treated quarters and the power of the aerosol apparatus.

With the goal of solving the problem of treatment of large inclosed quarters there was constructed an experimental aerosol apparatus AG-L6 on the base of the gasoline engine-L6 with a powerful fog formation of 3 to 4 liters per minute. The presence of this apparatus allowed us also to check under field conditions the effectiveness of the aerosol method in control of harmful insects which openly live in nature (short time action).

Much work was conducted in the field of small drop aviation spraying in conjunction with the aerosol method. The avaition fog-forming apparatus ATA (design of V.F. Stepanov) on the airplane PO-2A was subjected to wide testing.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The utilization of an aerosol apparatus on helicopters represents a large scientific and practical interest since the horizontal rotor of the helicopter creates a power vertical air current which will speed the settling of the aerosol cloud and facilitates the penetration of the drop into the crown of a plant and into its depths. The constructional scheme of an aerosol apparatus on a helicopter is sufficiently clear and the accomplishment of it will not encounter great difficulties. The combining of a helicopter which possesses the ability to change its horizontal speed from 0 up to 200 kilometers per hour or more (down to only suspension in the air) with the application of liquid chemicals opens a very wide prospective for agriculture, so that the future delay in the testing of this new highly effective method is permissible.

For conducting laboratory research there was constructed a two compressor apparatus and an aerosol thermo-mechanical generator on the base of the gasoline engine with a power of .9 h.p. The particle concentration of the highly dispersed aerosol is determined with the aid of the continous ultramicrophotometer design of B.V. Deriagin and G.A. Blasenko, which allows one to determine the concentration of drops in air up to 10 million drops per 1 cubic centimeter of air.

During 1949-1951 there was conducted much research work in the field of study of different toxicants and solvents.

Technical hexachlorane and DDT proved in the majority of cases highly effective in the control of insects and ticks, but in certain cases the toxicity of these chemicals in the aerosol state was insufficient (for example, against the harmful eurygaster, the acorn weevil, San Jose scale on apples, coccids on citrus fruits and other). Searching for new, more toxic chemicals, which possess a series of specific properties, remains a real task of research in this area.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

As a fungicide there was tested in the aerosol state copper naphthenate which was prepared according to the prescription of the Crimean Institute of Plant Protection, but the effectiveness of the action of the solution of it in diesel oil on apple scab and fruit rot in doses and concentrations suitable for the aerosol method was not confirmed.

Application of the aerosol method of treatment of fruit plantations with complex insectofungicides in the majority of the cases was unsuitable and therefore the search for a fungicide which will fit the conditions of application in an aerosol state is of the first order and the future task of NIUIF and VIZR. Before these same institutes there stands the not less esteemed and important task of searching for fungicides for the aerosol method of control of rust of wheat and flax, of phytopthora of potatoes and other diseases of agricultural crops.

Completely untouched is the search for disinfectants and bactericides for use in the application of the aerosol method in the control of microflora in rooms and open nature and among them in the near future the aerosol method of disinfection will be conducted in the fields of health protection, veterinary and sanitary fields. At the present time there are conducted experiments for the application of aerosols in the control of pests of greenhouses (the web mite in greenhouses) and pests of stored materials (wool and skins), in the disinfection of isothermic and freight wagons, refrigerator chambers, and also for control of the malaria mosquitoes. In the future time there must be adopted the application of the aerosol method for control of weeds, for control of fruit set and fruit drop, for defoliation of cotton and so forth. The solution of these problems goes beyond the limits of the Ministry of Agriculture USSR and acquires an interdepartmental character.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

In the All-Union order of Lenin Academy of Agricultural Sciences imeni V.I. Lenin, there was created an interdepartmental aerosol commission but in the absence of a powerful specialized research organization, the activities of the commission were insufficiently fruitful and limited to particular problems.

The study of the aerosol method of application of liquid chemicals in the USSR has only begun. To this business there must be attracted a series of specialized institutes of different departments, in this number also the Academy of Science, USSR.

The aerosol method of applying liquid and solid chemicals possesses a very important property-the absolute treatment of all surfaces and aerial spaces. So for example, with the aid of the aerosol of high dispersity there is treated all the surfaces inside a room and in practice the total volume of air enters into contact with the aerosol particles since in each cubic centimeter of air millions of liquid and solid particles of the chemical are in the state of turbulent movement; during the creation of an aerosol outdoors the aerosol covers all the vegetation and objects from all sides, from above downward and penetrates the depth of the crowns; the small droplets of the aerosol enter into contact with all the microorganisms which are found in the air since through one square centimeter of vertical thickness air passes per second hundreds of thousands and millions of drops.

These properties of aerosols allow us to in a new way state such complex problems as the complex disinsection and disinfection of large rooms and huge open spaces. The aerosol method in conditions of the Socialist economy-is a powerful means for reconstructing of nature in the interests of Communist society.

Moscow Station VIZR

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

A 157

Translation A-767
(In full)
db/A

Paikin, D.M., and Funskii, V.F.

Gasovye opylivateli.

[Gas dusters].

Zashchita Rastenii ot Vreditelei i Boleznei, vol. 1, no. 2, pp. 19-21 May-June 1956 (Not yet in DA)

(In Russian)

The All-Union Institute of Plant Protection, in conjunction with the Moscow Station, has developed the simplest possible device for the dusting of agricultural crops with poison chemicals. The construction of this device, named the gas duster, is based on the principle of utilizing exhaust gases from the engine of the tractor or automobile onto which it is mounted.

The general appearance of the duster which is mounted on the GAS-51 automobile is shown on figure 4. The exhaust gases of the engine are conducted through the pipe 1 to the rear end of the frame and there they escape at great speed through the nozzle 2. As the gas passes through the narrow part - the neck - of the nozzle there occurs a vacuum. The neck of the nozzle is connected with the bunker 3. Forced by vacuum action and its own weight the powder-like poison proceeds steadily from the bunker to the neck where it is picked up by the gas, pulverized and ejected. The particles of powder suspended in the air fall onto the plants under treatment and settle on them. The big angle of the slanting walls of the bunker, together with the air vacuum in the neck of the nozzle provide a continuous and even supply of powder for dispersion. Powder consumption is regulated by a valve 4 with the aid of a lever.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Thus, the gas duster has neither a blower nor a feeding mechanism, i.e. there are no operating parts. This fact insures utmost simplicity of its manufacture and the desirability of exploiting the gas duster.

The gas duster mounted onto tractor KHTZ-7 is shown on figure 3. Its construction is analogous with the automobile variety. Figure 1 shows a tractor-mounted duster with an additional device - a bar [shtanga]. As it comes out of the nozzle the air-dust current splits, enters the right and left halves of the distributing bar, and comes out through the opening of the bar in the form of ten separate streams directed downward directly upon the plants under treatment. When in a transport position and when arriving at an obstacle, both halves of the bar are raised by cables with the aid of the hydraulic lift of the tractor.

Fig. 1. Scheme of a tractor-mounted gas duster with a bar [shtanga].

Fig. 2. Scheme of an automobile-mounted gas duster:
1 - the pipe; 2 - the nozzle; 3 - the bunker; 4 - the valve.

Maximum consumption of powder by an automobile-mounted duster is 4 kg per minute, by a tractor-mounted one - 1.5 kg per minute.

The automobile-mounted duster is adapted to control of cereal and grass pests, and the tractor-mounted one for pests of maize, flax, vegetable crops etc.

The presence of a duster (without a bar) on the automobile or tractor does not interfere with the vehicle's use for transportation purposes or for work with trailing tools. The manufacturing cost of an automobile-mounted duster comes to 400 rub., of a tractor-mounted one without a bar - to 200 rub., and of one with a bar to 500 rubles. The weight of the duster is 20--30 kg.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Fig. 3. Scheme of tractor-mounted gas duster:
1 - pipe; 2 - nozzle; 3 - bunker; 4 - valve

Data available on extensive commercial tests indicates the high effectiveness of the use of gas dusters for the control of Eurygaster integriceps and locustidae on grain crop seedings. The results obtained from the treatments are satisfactory, the same as those in aircraft dusting, but consumption of poison chemicals is 30% less. Calculation of work done with the gas duster on the imeni Dokuchaev kolkhoz, Voskresensk District, Saratov Province, shows that its average daily efficiency, at a 15 meter wide reach of the dust wave, attains 120 ha.

We shall cite also data of the Far Eastern Station of VIZR according to which the rate of efficiency of the gas duster in the control of the armyworm [Cirphis unipuncta - lugovaia sovka] on grain crops covering an area of more than 12 thousand ha on kolkhozes in the zones of activity of the Verkhne-Suifenho [Suifinskaia] and Pogranichnaia MTS [Machine-tractor-stations], Molotov District, Suifenho MTS, Voroshilov District, Il'in MTS, Khonkai District, Maritime Territory, was 120-150 ha in a 10-hour work-day. Here pest eradication proved 8 times more effective while the cost of treatments was 3 times less expensive, compared to aircraft dusting.

In 1954, gas dusters were used to protect vegetable crops against pests of kolkhozes of the Leningrad Province [oblast'], and in the Moscow Province to protect flax crops against the flax flea [Aphthona]. In the zone of activity of the Teriaev MTS, Moscow Province, the rate of efficiency of the tractor-mounted gas duster in treating flax crops reached 40 ha in a 10-hour work-day. The wave width of the preparation dusted (benzene hexachloride dust) equalled 5-6 m at a total consumption of 6-8 kg per ha of poison chemicals. It is important to note that the effect of the poison

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

chemicals lasted 18-20 days, which cannot be achieved by hand treatment, because in the latter case the uneven and thick layer of the powder is easily carried off by wind.

Fig. 4. General appearance of an automobile-mounted gas duster at work

The examples cited bear out the fact that the automobile-mounted and tractor-mounted gas dusters answer the urgent needs of kolkhozes and sovkhozes.

The simplicity of servicing gas dusters and their inexpensiveness should also be taken into consideration. It suffices to point out that the price of tractor-mounted or automobile-mounted blower [ventiliatornye] dusters is 5--10 thousand rubles. In addition, the mounting, dismantling, repair and exploitation of these dusters incurs considerable consumption of funds and qualified manpower. In contrast to blower dusters, gas dusters are structurally so simple that they rarely break down and hence are practically never idle. In view of their comparatively low cost (200--400 rub.) and the availability of material, such dusters can be manufactured in sufficient numbers at MTS, on kolkhozes and sovkhozes, and treatment of large areas against pests can be accomplished with them in a short space of time, which is of first degree importance in the preservation of yields. For these reasons it can be assumed that the use of gas dusters need by no means be a temporary measure that is connected with a shortage of powerful blower dusters. Gas dusters ought to be available on every farm.

Hence it is desirable that the manufacture of these dusters be expanded in factories.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-758
(In full)
db/A

A 758

Povysit' effektivnost' ispol'zovaniia iadokhimikatov.

[To increase the effectiveness of the use of poison chemicals].

Zashchita Rastenii ot Vreditelei i Boleznei
vol. 1, no. 2, pp. 6-7, May-June 1956.
(Not yet in DA)

(In Russian)

Before the revolution, in our country, control of crop pests and diseases was in its initial stages. In the years of Soviet power the situation has changed sharply. A powerful chemical industry which produces a large amount of poison chemicals has been created in the USSR, the release of special equipment has been organized, and there has been created a State quarantine service for agricultural crops, and a large network of scientific-research institutions and operational organizations which develop and implement the measures for pest and disease control on a federal scale.

All this made it possible in a comparatively short time to eliminate mass reproduction of many dangerous pests, such as the Asian and Moroccan locusts, the meadow butterfly [lugovoi motylek - Loxostege sticticalis], gamma butterfly [sovka-gamma - Phytometra gamma] and some others which have incurred great losses to agriculture. It must, however, be admitted that problems of extraordinary vital importance have not been solved up to now, for instance, the control of Eurygaster integriceps, the beet weevil, the meal moth, the cotton bollworm, the San Jose scale, grape Phylloxera, grain rust, potato canker etc. Our country's agriculture still suffers great losses because of these pests and diseases.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

One of the main reasons for this situation must be traced to the lack of effectiveness of the chemical means applied.

It is known that among measures used for the protection of crops against pests and diseases, which are being implemented on many millions of hectares, the chemical method occupies a leading place. To provide for this method the chemical industry has sharply increased the production of poison chemicals - during the last five-year plan by 6.4 times, and in 1956 it has increased even more - particularly the release of DDT dust which has grown by 71%, mineral oil emulsions (MME) of DDT by 95%, and MME [mineral oil emulsions] of benzene hexachloride by more than 200%.

In the Directives of the 20th Conference of the KPSS[Communist Party of the Soviet Union], concerning the sixth five-year plan for the national economy between 1956-1960, it is indicated that production of chemical manufactures which ensure an increase in the productivity of agricultural crops must be raised considerably; that production of new types of concentrated mineral fertilizers, and new, more effective poison chemicals for the control of crop pests and diseases must be organized, and that large-scale commercial production of chemicals for weed control must also be organized so as to provide for a considerable reduction of labor consumption incurred by tending agricultural crops.

Thus, the release and assortment of poison chemicals needed for the protection of plants against pests and diseases and for weed control will expand in our country from year to year. The problem is how to utilize the poison chemicals properly and to obtain the maximum effect from their application.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

At present there are the following basic methods for the utilization of poison chemicals in the control of pests and diseases: dusting, spraying and dropping of poisoned bait. Dusting materials are composed primarily of DDT dusts containing 5--5.6% of a technical preparation, or of a 12% concentration of GKHTSG [benzene hexachloride], with 88--95% of these poisons becoming part of inert fillers.

To obtain the required effect from dusting it is necessary to apply 60 kg of a poison chemical to each hectare of agricultural crops treated. According to special investigations, these high rates are determined by the small coefficient of useful application of dust-like preparations. The point is that during the dusting only a portion of the preparation lands on the object under treatment, while a considerable share of it - up to 50% - is uselessly wasted in surface treatments. Losses are particularly heavy in aircraft dusting - a method which occupies an important place in operations. Investigations conducted by GosNII GVF [State Scientific-Research Institute of the Civil Air Fleet] and other scientific-research organizations have demonstrated that in aircraft dusting of orchards with calcium arsenate only 10--25% of the poison lands on leaves and fruit, while the rest of it, i.e. 75 to 90% is lost without a trace: 21--65% is carried off by air currents, 31--65% lands on the ground.

In dusting field crops with the PO-2A airplane, the coefficient of useful application of poisons is also very low: for Paris green it is 10--15%, for calcium arsenate 25-70%, calcium arsenite 50--70% etc. Nor is the coefficient any higher for DDT and GKHTSG dusts.

An attempt to decrease substantially the consumption rate of a dusting poison at the expense of increasing the concentration of the active element

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

has so far been unsuccessful, because the construction of available machines in such that they do not ensure uniform dusting of plants if the rate of preparation consumption is low.

If it were taken into account that more than 70% of the above mentioned production goes into preparations used in dusting, then it would become clear how very important it is to increase the coefficient of the beneficial use of dusting preparations.

The coefficint of the useful application of poisons used for spraying is considerably higher, but even with this method the loss of poisons is very high. In spraying field crops by the surface method, usually no less than 20-30% of the working liquid lands on the ground and not on the plants under treatment. Even a larger portion of poison chemicals lands on the ground when tree plantings are treated. Aircraft spraying guarantees that more liquid will land on the plot under treatment, but here, too, the coefficient of useful application of the poison is not always sufficiently high. Thus, B.I. Rukavishnikov points out that in fog-like (dimensions of particles up to 40 microns) spraying of a DDT solution, the losses of poison on the average are 91%. In experiments conducted by V.E. Kreisberg in 1955 in Uzbekistan, only 16-26% of the poison settled on plants when grain crops were sprayed with a 2,4-D preparation from a Po-2A airplane.

There is at present, a series of methods already developed that permit a decrease in the consumption rate of poison chemicals and an increase in their effectiveness, as a result of a rise in the coefficient of beneficial use.

One of these methods is the application of insecticidal aerosols which are destined to enjoy wide-spread application to the control of granary and

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

warehouse pests, and of pests of orchards, tree belts, forests, park plantings, and possibly of a series of field crops.

It is essential that improved and more efficient equipment be developed more rapidly and that its commercial production be organized in quantities that will meet fully the demands of agriculture.

Insecticidal aerosols constitute only one, but not the only method of increasing the effectiveness of chemical means used in the control of crop pests and diseases.

It is known that in a number of countries the method of dusting has, in many instances in recent years, been replaced by the method of spraying high concentration solutions in phases of fine drops and foamy fogs in which the unit consumption of liquid decreases substantially while effectiveness increases. Thus, for example, in the GDR [German Democratic Republic] preparations and the corresponding equipment have been developed for foam-fog and fine-drop spraying of concentrated solutions. The same is available in the USA, England, France and in a number of other countries.

We deem it essential that here, in the Soviet Union, due attention should also be paid to the development of diverse methods that will permit a sharp decrease in the consumption rate of poison chemicals used in the treatment of an object, and an increase in the effectiveness of the chemical method of control of crop pests and diseases and of weeds, as a result of an increase in the coefficient of beneficial utilization of preparations and a decrease of inert fillers in their content.

The use of such methods will make it possible to accomplish chemical treatments on cropped areas, tree plantings and other agricultural resources infested by pests and infected by diseases and weeds, to free our chemical

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

industry of the need to produce superfluous manufactures, and our transportation facilities - of hauling unnecessary loads, including useless, inert fillers.

In the final analysis this will permit a saving of many tens of millions of rubles for the national economy.

It is an affair of honor of the workers of the chemical and machine construction industries and of agriculture to develop and adapt to production methods, within the next year or two, that will help to eliminate the colossal losses which the country has had to bear up to now, because of imperfections in poison chemicals and in the equipment used for their application.

[There is one illustration of an automobile-mounted duster].

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-769
(In full)
db/A

A 759

Za dal'neishee razvitie nauchnykh issledovanii v oblasti zashchity rastenii.

[Further development of scientific investigations in the sphere of plant protection].

Zashchita Rastenii ot Vreditelei i Boleznei
vol. 1, no. 2, pp. 3-5, May-June 1956.
(Not yet in DA)

(In Russian)

The history of socialist agriculture is indivisibly connected with the history of Soviet science which has made a notable contribution, in theory and practice, to the nation-wide effort to raise the level of agriculture and of animal husbandry in our country. Under present conditions, however, when agriculture is faced with new, huge tasks of increasing the production of grain, cotton, beets, elongata flax, [len-dolgunets], potatoes, vegetables, meat, milk, wool, eggs and other agricultural products, the role of the agricultural sciences grows immeasurably and the demands made upon scientific workers must be increased considerably.

In the practical implementation of the Directives of the 20th Conference of the KPSS [Communist Party of the Soviet Union], concerning a further increase in yield and the elimination of losses in agricultural production, one of the leading places must be reserved for measures dealing with the control of plant pests and diseases. There is available data showing, for instance, that complete elimination of losses resulting from crop injury caused solely by the spider mite, [Tetranychus urticae], aphids, beet weevils, Eurigaster integriceps, and smut and rust, would give our national economy

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

hundreds of thousands of tons of additional cotton and millions of centners of sugar beets and grain crops.

It is true that agriculture in the Soviet Union has long since forgotten the devastation caused in the past by locust raids which still is being caused in a number of foreign countries. Methods and means developed by Soviet scientists safeguard the young crop against a whole series of other dangerous pests and diseases. Nonetheless, there still are many unsolved problems.

The methods available at present, for instance, for the control of Eurygaster integriceps, the spider mite, beet weevil, mallow moth [Gelechia malvella] and cotton ballworm, the San Jose scale [Kaliforniiskaia shchitovka] and rust of grain crops, have not as yet enabled us to prevent considerable losses of yield caused by these pests and diseases.

Soviet scientists are facing the task of expanding research work on synthesizing new, more effective preparations for the control of plant pests and diseases, of hastening the testing of these preparations and of developing methods for their application to agricultural production. It is essential that the work of synthesizing new organic insectofungicides and bactericides and of evaluating their toxicity, and also of finding new zoocides [zootsidy] and nematocides be expanded. Particular attention must be paid to the selection of preparations that are least toxic for warm-blooded animals and harmless for useful entomofauna. Here, the leading role must be played by NIUIF [Scientific-Research Institute of Fertilizers and Insectofungicides], VIZR [All-Union Institute for Plant Protection] and a number of institutes of the Academy of Sciences, USSR, which up to now have done little for the

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

development of new, highly effective poisonous chemicals or for their adaptation to production. In connection with the above statement, it is appropriate to raise the question of creating a firm network of State operated stations where new preparations will be tested. Such stations, with qualified workers on their staffs and modern equipment at their disposal, will be able to secure diverse tests of newly synthesized preparations under diverse industrial conditions, and on many crops, within a short space of time, and to make the necessary recommendations for their use.

It is also necessary to expand considerably investigations in the spheres of biology, biophysics, microbiology and biochemistry which will permit the development of new methods based on a combination of the biological method and the chemical and agrotechnical measures to be used in the control of pests and diseases.

It is desirable, concomitantly, to expand in every way possible investigations of immunity phenomena in plants, and also of the adaptability of noxious organisms to the action of various poisonous chemicals.

Scientific-research branch institutes and, particularly, selection stations can render important assistance by developing economically valuable varieties of agricultural crops resistant to diseases and pests, and by their propagation and adaptation to production.

To resolve the problem of increasing the productivity of agricultural crops, it is at present urgently necessary that VIZR and its branch institutes, concomitantly with the search for new plant protection methods, and the improvement of those available, develop within the shortest possible time a system of safeguarding certain crops (sugar beets, cotton, flax, maize etc.) against the entire complexity of pests and diseases under conditions

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

of the different zones of the USSR. This system is to include agrotechnical, prophylactic, biological and chemical measures for the control of all pests and diseases injurious to these crops. Along with the above, zonal experimental stations, relying on data of VIZR and of the scientific-research branch institutions, must develop a system of measures including dates and procedures for the work to be done to safeguard plants against all pests and diseases indigenous under local natural conditions, and recommend this system to the kolkhozes and sovkhozes of the zone.

Complete and timely accomplishment of all plant protection measures is possible only on the basis of extensive mechanization. Side by side with the increase in the scope of tractor work, it will be necessary to expand the use of aircraft for which there is considerable promise in connection with plans designed for the eradication of weeds and woody vegetation from fields and pasture-meadow resources with the aid of herbicides. Scientific-research institutions are faced with the task of working out more improved designs for airplanes, gyroplanes and aircraft equipment for the spraying and dusting of plants, methods for mechanized loading of poison chemicals, and also more efficient and technically improved surface equipment for the application of poison chemicals. Special attention must be directed to the creation of aerosol generators and equipment converting the spray of concentrated solutions into fine droplets. The solution of this problem is of unusually great technical and economic importance, for it will enable us to reduce considerably the cost of poison chemicals, particularly of different dusts the preparation of which requires a large amount of various fillers, while the effectiveness of extermination work will increase. Construction organizations will, within the shortest possible time, have to create the most efficient types of machines for seed disinfection, for the preparation, placement and scattering of poison

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

bait, and they will have to design injectors and other devices for the introduction of poisonous chemicals into the soil.

One of the greatest defficiencies in organizing plant protection work is inadequate prognosis service. In many cases it leads to ill timing and, consequently, to low effectiveness of the prophylactic and extermination measures conducted. Scientific-research institutions, primarily VIZR, in conjunction with its branch institutes, must, in the near future, develop a scientifically grounded method for compiling short-term and long-term prognoses of the reproduction and distribution of the main agricultural pests and the development of diseases wherewith production could guide itself unerringly in its practical work.

It is in the interest of the work that all material of the accounting and prognostic services be utilized widely by the zonal stations and institutes so that they might, on the basis of these data, the operational records of agricultural agencies, and of their own material, work out surveys and prognoses of the reproduction of pests and recurrence of diseases of the principle crops cultivated in these zones.

These surveys and prognoses must reach Machine-Tractor Stations, kolkhozes, sovkhozes and the appropriate agricultural agencies in plenty of time. Branch institutes must compile nation-wide [obshchesoiuznye] prognoses and surveys of the corresponding crops. VIZR, drawing on all material of the State accounting and prognostic service of the zonal and branch institutes, must ensure timely development of a nation-wide survey on the phyto-sanitary situation of the country and of prognoses for the distribution of the more dangerous pests and diseases in the territory of the Soviet Union.

Within the complexity of measures used to increase the production of agricultural products, weed control is of exceptional significance. It must

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

be acknowledged that, regardless of a considerable consumption of labor and funds in the control of weeds, many of them, including such dangerous weeds as dodder, ragweed, smartweed and others, continue to spread on the fields of kolkhozes and sovkhozes and to cause great losses to the economy of these farms.

The 20th Conference of the KPSS has set down the task of organizing, within the sixth five-year plan, large scale production and application of chemicals to the control of weeds in order to ensure a considerable reduction in labor consumed in tending young crops. Soviet scientists must find more effective herbicides and they must develop methods for their use in the control of various weed species on seedings of the principal agricultural crops.

A considerable share of this type of work can be carried out by the zonal stations which are to organize herbicide tests under various natural conditions and to provide extensive aid to kolkhozes and sovkhozes in the application of herbicides to production.

Many plant protection measures involve great consumption of materials and funds. An over-all reduction of this consumption must become the most important problem of every investigation. Practices involving methods and processes recommended by scientific-research institutions for the control of pests and diseases must be absolutely stopped, if their cost exceeds the the anticipated effect of their application. Economic indicators must become the most important criteria in the evaluation of all proposals recommended by scientific institutions for adaptation to production.

The decree concerning measures for the improvement of the work of scientific-research institutions for agriculture, adopted in February of the

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

current year by the Central Committee of the KPSS and the Council of Ministers of the USSR is advancing considerably the role of these institutions in the accomplishment of the practical tasks confronting socialist agriculture. It, no doubt, will contribute toward a further rise in the level of research work and toward a speedy utilization of the achievements of agricultural science, including the protection of plants against pests and diseases, in kolkhoz and sovkhoz production.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-760
(In full)
db/A

A-760

Mezhduvedomstvennoe soveshchanie po aerozoliam. [1]

[Interdepartmental conference on aerosols].

Zashchita Rastenii ot Vreditelei i Bolezneĭ, vol. 1, no. 2, p. 63, May-June 1956 (Not yet in DA)

(In Russian)

The regular interdepartmental conference on the use of aerosols was held in Moscow on March 19-24, 1956.

The conference was called by the Section of Plant Protection, VASKHNIL [All-Union Academy of Agricultural Sciences im. Lenin]. It was attended by more than 250 delegates from different organizations and districts of the Soviet Union and from the Republic of Czechoslovakia.

Reports read at the plenary meeting concerned means for increasing the effectiveness of the use of poison chemicals (E.N. Ivanov), experience in the application of insecticidal aerosols in the USSR (G.I. Korotkikh), and a survey of literary works on the use of aerosols in agriculture (V.F. Dunskii).

The physico-chemical section discussed reports on the theory of aerosol mobility and distribution in the atmosphere, on the sedimentation of of particles on streamlined [obtekaemye] articles, on methods of and special equipment for the investigation of aerosols. Dr. V. Koula's report on experience in the use of aerosols for plant protection in Czechoslovakia aroused much interest in the Plant Protection Section. In 1955, 162 thousand

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

ha of potato plantings were treated in the Republic against the Colorado beetle with mechanical aerosols with the aid of airplanes. Complete destruction of larvae of the 1st to 4th age groups had been registered at a 6 liter consumption of a technical DDT solution in polymethylnaphthalene (intermediate solvent) and No. 107 oil. It should be noted that in the Republic of Czechoslovakia extensive tests were made of aerosol generators of the thermomechanical action principle (of the type of our AG-L6). Commercial production of such machines will be organized in 1956. Good results were obtained also from tests made of a hand-operated aerosol generator which was constructed on the base of a pulsatory reactive engine (60 cycles per second) and which possessed comparatively high efficiency and technical effectiveness. A special feature of such a generator is the absence of an air compressor and a starting motor, as a result of which its total weight, completely loaded with fuel and a reserve of chemicals enough to treat one hectare in an orchard, is only 11.2 kg.

Of the papers heard by the Section of Plant Protection those which presented the most interest were I.A. Kaiudin's (Transcarpatian Base of VIZR) on the aerosol method for control of orchard pests, S.P. Berdennikova's - on the results of years of aerosol application to the control of pests of oak plantings in the Main Botanical Garden of the Academy of Sciences, USSR, A.M. Churakov's (Mosstazra [probably Moscow Station of Plant Protection]) - concerning results of aerosol application to control of the European cornborer [steblevoi motylek na kukuruze - Pyrausta nubilalis], and A.E. Volkov's (Moscow Province Station for the Protection of Green Plantings) - on aerosol and other methods for the control of pests of woody plantings on territory of the Moscow Province.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

At the Section of Parasitology 15 reports were read on the application of artificial smoke and fogs to the control of insects and carrier-ticks spreading diseases of man and animals.

The report which aroused much interest in the Equipment Section was submitted by A.I. Laikin (TSNIDI [Central Scientific-Research Disinfection Institute]) - on new aerosol equipment for medical sanitation treatment of buildings. Some samples of the equipment were exhibited. I.F. Snegovskii (VISKHOM [All-Union Scientific-Research Institute for Agricultural Machinery]) reported on the prospects of sprayer and duster production in the USSR, and of new equipment in foreign countries exhibited at the Leipzig international fair in 1956. S.D. Popov (NII GVF [Scientific-Research Institute of Civil Air Fleet]) and N.I. Kamov (SKB-938 [Bureau of Special Design]) reported on the use of native gyroplanes in agriculture and on the results of their testing. A film was shown on the use of new techniques (smoke bombs [dymovye shashki], gyroplanes) for control of mosquitos.

Mosstazra [Moscow Station for Plant Protection (?)] has organized an exhibition of diverse native aerosol equipment of the Thermomechanical and mechanical principle of action (EAU-1, AG-16 1956 model, ODV-300, MAG-1 etc.).

On the final plenary meeting a resolution was passed on the future trend of research and industrial work within the sphere of the aerosol method.

G. K.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-761
(In full)
db/A

A 761

Glebov, M.A.

Ekonomicheskaia effektivnost' zashchity rastenii.

[Economic effectiveness of plant protection].

Zashchita Rastenii ot Vreditelei i Boleznei, vol. 1, no. 2, pp. 11-12 May-June 1956 (Not yet in DA)

(In Russian)

It is known that agricultural crops are often injured by pests and diseases which cause great losses to production. Nonetheless, measures developed for the protection of plants ~~are~~ have up to now been adapted to agricultural production very slowly. One of the reasons for this situation is the dearth of information afforded agricultural workers on the economic effectiveness of these measures.

Meanwhile, material available at the All-Union Institute of Plant Protection shows that adaptation of systems of measures, or individual measures, for the protection of yield proves economically highly effective.

It has, for instance, been estimated that, as a result of inadequate pest control, kolkhozes of the Leningrad Province leave annually up to 60 thousand tons of cabbage yield behind, i.e. an equivalent of approximately 15 million rubles.

At the same time, there is convincing data available concerning the high profits derived from crops if plant protection against pests was paid

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

sufficient attention. Thus, in 1954, on the kolkhoz imeni Kalinin, Volosovo District, Leningrad Province, the monetary share of a kolkhoznik's income per work-day had increased by 17% solely because the yield had been safeguarded against pests.

The returns obtained for each ruble spent for plant protection amounted to more than 25 rubles. Pest control decreased labor consumption in cabbage growing. Thus, on plots treated against pests, the farm obtained 78 kg of cabbages per work-day, yet on plots not treated - 53 kg. On the "Pobeda" kolkhoz, Irkutsk Province, protection of beet crops against soil midges [zemlianye bloshki] by means of dusting the sprouts with DDT dust on an area of 20 ha produced a yield increase (compared with untreated plots) averaging 42 centners per ha, estimated at the total sum of 84 thousand rubles for the entire area. Yet the cost of crop dusting (price of poison chemicals, fuel, wages of tractor drivers etc.) is estimated at a total of 468 rubles. Consequently, the net profit made by the kolkhoz from the entire area amounted to 83,532 rubles. We shall cite an example from the control of pests on clover seedlings. Years of experiments conducted by VIZR [All-Union Institute of Plant Protection] have demonstrated that the yield of this crop can be doubled if the proper measures are applied. The 1954 data of the Pushkin Base of VIZR concerning the kolkhoz imeni Kalinin, Volosovo District, Leningrad Province, are convincing. Here experiments were conducted in dusting clover seedlings with benzene hexachloride and DDT dusts. While control (not dusted) yield of clover seed was no more than 0.8 centners per ha, the yield on the experimental plot, which measured 29 ha, amounted to 1.2--1.4 centners per ha after it had been dusted with Benzene hexachloride and DDT dusts twice, and in a variation in which borax was used as a dusting component at the rate of 3 kg per ha, in addition to

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

benzene hexachloride, the yield of seed increased up to 1.6 centners per ha.

Considerable increases in the yield of clover seed were obtained also in other experiments conducted in different districts of the Leningrad Province, after the young crop had been treated with the appropriate poison chemicals. In terms of prices paid for half-finished goods, the value of the yield increase obtained in clover seed-plants which had been treated with poison chemicals against pests is determined, on the average, at the sum of 1280 rubles per ha.

The expense of dusting twice 1 ha of clover seed-plants amounts to 78 rubles. Consequently, the net profit per hectare equals 1202 rubles. If the entire area cropped to clover seed-plants on kolkhozes of the Leningrad Province were taken into account, then it appears that, merely as a result of pest control on seed-plants, the kolkhozes of the province would derive an additional income of more than 10 million rubles.

Of great economic consequence is also the properly organized protection from pests of the crops of elongata flax [len-dolgunets]. According to material from the cis-Baltic STAZR [tr. note: probably Station for Plant Protection], the expenditures incurred in 1954 for protection of flax crops on an area of 13,689 ha amounted all in all to 275 thousand rubles, yet the additional production obtained exceeded the sum of 16 million rubles. It is visible from the table cited below that the difference in yield on plots treated with poison chemicals and on those not treated is quite imposing. [Begin p. 12].

Especially important economic results can be anticipated from the use of a system of measures for the protection of orchards from pests, developed with a view to zonal characteristics. This is graphically evident from the example of sovkhoz No. 12, Azerbaidzhan SSR, where the following indicators

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

were obtained in 1955 from the application of protective measures to pome fruit orchards (see table 2).

Table 1.

Comparative productivity and quality of flax products as a result of crop treatment against pests with poison chemicals.

Name of product	Yield in c/ha		Difference
	On plots treated with benzene hexachloride	On plots not treated with benzene hexachloride	
Flax straw [l'nosolomka]	7.2	5.6	≠ 1.7
Flaxseed	6.0	4.1	≠ 1.9
Quality of flax fiber	No .13	No.11	≠ 2 numbers

The total cost of treating 1 ha in an orchard by the VIZR system (6 repeated sprayings) amounts to 1026 rubles. Net profit per ha gained by the sovkhoz amounted to 18,909 rubles.

Expenditures for "economical" treatments of the orchard were less and amounted to 676 rubles per ha, as a result of less consumption of the working solution and a somewhat different composition of the poison chemicals, but, by the same token, the returns obtained by the sovkhoz from an identical plot were also less and amounted to 4120 rubles per ha.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 2.

Application of diverse systems of measures	Yield of apples total kg/ha (picked and fallen)	Including		Value		Total value of yield (in rub.) per ha
		Yield picked (kg/ha)	Amount of fallen fruit (kg/ha)	Picked yield (in rub.) per ha	Fallen fruit (in rub.) per ha	
Complete system of VIZR	29991	20684	9307	41368	9307	50675
"Economical" treatment	23670	11835	11835	23670	11835	35505
Control	21171	9569	11602	19138	11602	30740

The results of orchard protection obtained on the "Sad-Gigant" sovkhoz, Krasnodar Territory, are even more convincing. The net profit obtained as a result of applying the complete system of measures developed by the Slaviansk Base of VIZR amounted to 50,498 rubles per ha.

Thus, we can see that the plant protection measures against pests and diseases developed by science and tried in practice are economically highly effective and their wide-spread adaptation to production will contribute toward an improvement in kolkhoz and sovkhoz economics.

VIZR

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

...lation A-762
(In full)
vg /A

Kosov, B. F.

Bor'ba s eroziei - delo gosudarstvennoi vazhnosti.

[Erosion control - a problem of State importance].

Les i Step', vol. 4, no. 11, pp. 48-62.
Nov. 1952 99.8 1565

(In Russian).

A-762

It is known that soil erosion, that is the disintegration of the soil cover under the influence of a water run-off and the action of wind is causing agriculture great losses. Leading to the widening of old and the formation of new gullies, erosion processes reduce the useful arable area, prevent an increase in productivity and obstruct proper utilization of the land.

Erosion control, which has been conducted in our country since the first years of the establishment of Soviet power, is assuming especially vital importance right now, when the great Stalin plan for the transformation of nature is being implemented. In the historic decree of the Council of Ministers, USSR, and the Central Committee, VKP(b) [All-Union Communist Party (of bolsheviks)], dated Oct. 20, 1948, the elimination of disintegration processes in the soil cover (leaching and blow-off of soils) by means of establishing gully and ravine tree plantings is noted as an integral part of the measures for the grass-field system of agriculture which are designed to ensure high and stable yields in the steppe and forest-steppe districts of the European part of the USSR.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The volume and rate of the work involved in erosion-control will be growing from year to year. By decree of the Party and the Government, the Ministry of Forestry, USSR is committed to the complete reforestation of all gullies and ravines on kolkhoz lands in the above districts of the country by the year 1965. Here, in accordance with the plan, 586 thousand hectares of gully and ravine plantings must be established by the end of 1955.

In the directives of the 19th Party Conference concerning the fifth five-year plan of development in the USSR for the years 1951-1955, the importance of soil-erosion control is noted also as on the factors contributing to the further rise of agriculture.

In our country all material and technical conditions essential to a timely implementation of plans for erosion-control have been created. Nonetheless, the successfullsolution of the gully problem depends to a considerable degree on its scientific development and organizational preparation.

On the basis of achievements of leading Soviet scientists and experience in anti-erosion work, a series of basic control measures for soil and gully erosion have been developed and are being applied; they include the creation of moisture regulating tree belts in fields within the limits of water-collectors in gullies, tree belts near ravines and gullies, unbroken reforestation of the gullies and ravines themselves, tinning [zaluzhenie] of water-conveying small channels [lozhbina] and steep slopes, construction of ponds and reservoirs etc. The skilled

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

workers, however, who perform these tasks on the spot, had until recently no clear or concrete instructions as to which antierosion measure to select under different natural conditions.

It is true, methodical instructions for reforestation of gullies and ravines were worked out in 1952 and were incorporated in the "Instruction for planning and establishment of shelter belt plantings in kolkhoz and sovkhoz fields in the steppe and forest-steppe districts of the European part of the USSR", approved by the Main Administration for Shelterbelt Development at the Council of Ministers, USSR. These instruction compiled with a maximum approach to local conditions will undoubtedly be of considerable assistance to production workers. Nonetheless, a number of difficulties are encountered in work done on the spot even now, inasmuch as the accomplishment of antierosion measures must be tied up with considerations of other requirements and the economics of agricultural production, and in addition, it often calls for a preliminary solution of a series of scientific problems.

For instance, when forest belts are planted near gullies and ravines, the selection of a place and distribution of trees requires not only an accurate estimate of the width and the composition of the belt, but also justification of the economic expediency of selecting a certain section of plowland for planting. This is of special importance in badly eroded gully districts where every hectare of plowland represents great value. The building of ponds and reservoirs at the summit of gullies and ravines requires an even more thorough analysis of natural conditions when a place is selected, as well as an appraisal of the economic desirability of the construction. Finally, the very selection of a certain measure recommended

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

for the control of gully erosion necessitates a careful analysis of the specific economic and natural character of the territory - agricultural specialization, district economics, and geological, geomorphological, hydrological, soil, botanical, climatic and other natural conditions.

Experience shows that planning and implementation of anti-gully measures are conducted in a number of cases without the required knowledge or appraisal of all these circumstances and, therefore, fail to produce the desired results. Thus, on one of the kolkhozes in the Tambov Province, inspected by the expedition of the Moscow State University, hydrogeological conditions were not taken into consideration when tree belts were planted near gullies and, as a result, a considerable section of such a belt slid into the gully. An incomplete account of the topographical, soil, climatic and other conditions submitted when tree belts near gullies and moisture regulating belts are planted in badly disintegrated districts (for instance, the right bank of the Don River) frequently leads to a washout of young plantings, and in cases of gully summit embankments (as in the Rostov and Tambov Provinces) - to disintegration of the bank and a vigorous growth of gullies.

Even in a closer range of problems connected with the use of recommendations made in the Instruction which call for corrections "as to locality" under conditions of a given kolkhoz or district, skilled workers cannot always find the answer.

The difficulties encountered in the implementation of anterosion measures, as we have already indicated, are the result of insufficient development of many basic scientific questions.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

One of the indicators of insufficient investigation of the gully erosion problem is the extreme inconsistency in the existing concepts of the distribution and the area of gullies in the territory of the USSR. These divergencies can be explained by the difference in method adopted by different authors, and also by the imperfection of the cartometric and inquiry methods used in computing gully areas. In a situation of this kind it is impossible to plan accurately either the scope of or the time needed for antigully work.

In the over-all planning, an accurate appraisal of the loss caused by gullies to the national economy is no less important than the scope, the rate, and the cost of gully control. Yet up to now there is no such appraisal available.

One of the most important aspects of the gully problem is the question of their intensive growth. Nonetheless, up to now no systematic mass observations of current gully growth have been organized. Yet, without an account of this circumstance it is impossible to make the right recommendations for the control of gully erosions in localities of different types.

We are pointing out only some of the more general unsettled basic questions pertaining to the problem of gully erosion and its control. Insufficiently developed, however, remain many other questions which at present are illuminated more fully in the works of A.S. Kozmenko, S.S. Sobolev and N.I. Sus, for instance, the history of the origin and development of gullies on territory of the USSR, the processes of their formation and growth, methods of gully erosion control, problems of economical adaptation of gullies etc.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

A lag in the development of the erosion problem in the face of the majestic sweep of the work in progress calls for a radical reorganization of all scientific work done in this sphere.

Control of erosion is conducted on a vast territory in regions of the most varied types. Diverse combinations of natural conditions call for application of diverse systems of antierosion measures. Under such conditions scientific institutions are often unable to meet fully the demands of practice. In addition to the above, there appears to be a lack of intelligent organization of research work investigating erosion processes with respect to new problems.

At the present time various institutions in different districts deal with these problems, in accordance with diverse plans and programs, using distinct methods. Lack of coordination of programs, plans, and of districts under investigation results in divided energy and in duplication of work, and reduces the scientific level.

The question of coordinating all of this work, of creating a special center for their direction has been brought up repeatedly, but has not been settled up to now. In most cases the matter ended with the creation of committees which, for lack of sufficient authority, were unable to unify or to organize joint work of the scientific institutions of different departments.

Recruitment by some scientific-research institutions of individual specialists or groups of specialists from other departments as temporary participants of expeditions or as consultants in the solution of some special problems has justified itself the most. Such practice justifies itself fully in resolving individualy problems of erosion control, but at present it no longer answers vital needs.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

In connection with the erection of great Communist structures and with the implementation of the Stalin plan for the transformation of nature, the task of soil and gully erosion control is growing into a major scientific problem of federal [obshchegosudarstvennyi] importance, which calls for a reorganization of scientific-research work. As an integral part of the plan for the transformation of nature in vast territories of the country, such problems can be solved successfully only as a group [kompleksno], proceeding from the general economic problem of development of each transformed district, taking into account the transformation measures implemented in these districts, and all economic and natural factors.

All of these circumstances should be considered also in settling separate, more specific questions of erosion control, such as, control of the gully that threatens the railroad bed, the highway or the dirt road etc. The solution of such problems is also impossible unless one knows the general laws of the development of erosion processes and their relationship to various conditions. [Begin p.61].

Knowledge of the general laws is even more important in the transition from measures applied to one small area to measures applicable to a district, province, territory, republic or any extensive territory subject to thorough transformation. All of this makes it imperative that, in settling questions of erosion control, specialists of the most diverse branches of knowledge - geomorphologists, hydrologists, soil scientists, climatologists, botanists, agro-forest developers, agronomists, economists, geographers of wide sections etc. - consider long, constant and close cooperation their duty.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

At present there is a large number of scientific organizations which have at their disposal the staffs needed to solve the erosion problem. Primarily, it is the only inter-departmental scientific organization - the Academy of sciences, USSR, with its numerous institutes. However, each of the institutes of the Academy of Sciences in which these staffs are distributed is working on its own speciality and, hence, it is extremely difficult to unite their specialists for the solution of such complex inter-institutional problems as the one of soil erosion.

This is even more difficult for large departmental organizations such as universities and scientific-research institutions, and planning and production organizations.

The problem of soil and gully erosion has always been dealt with at all of these institutions and organizations to the extent possible, but never as extensively as it is required at the present time.

The complex solution of the erosion problem calls for the creation of a special State organization of an inter-departmental character. For the beginning, the most desirable form of such a scientific-research institution would be a specialized institute within the system of the Academy of Sciences, USSR, of one of the Ministries or of an administrative institution heading a federal project for the transformation of nature (for instance, at the NTS [Scientific-Technical Council] of the Main Administration of Shelterbelt Development at the Council of Ministers, USSR).

The time for the creation of such an institute is entirely ripe and it could be accomplished without any special additional expenditures by reorganizing one or a number of the existing scientific-research institutions.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The problem of establishing such an institution and of the corresponding reorganization of scientific-research work calls for serious consideration by scientific and industrial organizations which deal with such problems. It is desirable that such a discussion, including an extensive exchange of experiences, be conducted at an inter-departmental conference on soil and gully erosion control which could be called by the Academy of Sciences, USSR, or by the Main Administration of Shelterbelt Development at the Council of Ministers, USSR.

At the conference, there should be submitted reports of departmental organizations explaining the nation-wide economic importance of the erosion problem and its control, reports of planning and industrial organizations of the different ministries which implement antierosion work, and of scientific-research organizations which develop the scientific basis of measures for soil and gully erosion control.

The conference should be attended by scientists of the Academy of Sciences, USSR, of universities, of scientific-research, palanning, and industrial organizations of the Ministries of Agriculture, Forestry, Communications, the River Fleet, Public Economy, and of other interested departments.

As a result of the conference, a single inter-departmental plan of work should be created for the study of soil and gully erosion and for the development of measures for its control, a public center should be formed (a commission, bureau, council) to coordinate the work, and proposals for a desirable form of the organization for antierosion work on a federal scale should also be worked out.

Erosion control is an inalienable part of the Stalin plan for the transformation of nature. In the end, it is a struggle for the conservation

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

of tens and hundreds of thousands of hectares of the most valuable land, for an increase in the fertility and productivity of the fields, and for a general rise in our agriculture.

A speedy and successful solution of the problems of erosion control is an affair of honor of Soviet scientists.

Nauchno-Issledovatel'skii Institut Geografii
Moskovskogo Gosudarstvennogo Universiteta

* * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Kholupiak, K. L.

Eroziia pochvy i mery bor'by s nei.

[Soil erosion and measures for controlling it].

Sovet. Agronomiia vol. 10, no. 6, pp. 48-50,
May 1952 20 So84

(In Russian)

A 763

A high and stable yield of agricultural crops in steppe regions of our Union depends in many respects on the presence of moisture in the soil.

Utilization of grass crop rotations together with afforestation are a potent means for accumulation of moisture, its preservation and economic spending, regulation of rain and thawed waters, and, consequently, protection of soil from water erosion.

In contrast to wind erosion, breakdown of soil by running waters is called water erosion. Three basic types of water erosions, which are the most wide spread are: the surface (level), striated and gully.

During surface erosion the upper, most fertile layers of soil are washed off from the whole surface of the slope. This phenomenon is most often seen in spring on structureless soils when the upper layer is converted into liquid mud, being over-saturated with water.

The "melkostruichatyi" [fine-watered] washout or striated erosion occurs in places where running waters accumulate into small streamlets. Such places are usually tracks of a harrow, of a cultivator, colter and

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

wheels of a seeder, furrows, which form during plowing, oval ridges and split furrows, and other water - accumulating and water-guiding lines which are situated at an angle to the contour line of the locality.

After thawing of snow, especially on plantings of winter crops one often observes a so-called ribbon washout in the presence of which small streams are washing off the upper layer of soil in a form of a strip 10-50 cm wide, and sometimes up to 1 m or more to a depth to which the seeds were sown (6-7 cm). The well-rooted shoots often do not become washed away by water, but remain attached to the surface of the soil by the ends of their roots. Nevertheless, with a weaker packing of the whole plowed horizon, and with a greater vigor of streams and their longer reaction, the depth of ribbon washouts increases to the depth of the plowing horizon and takes on the form of a striated erosion.

Soils which are yearly subject to continuous washout and to striated erosion, lose their most fertile part and as a result of this pass into a category of eroded lands, giving small crops with hard-to-reestablish fertility. That is the reason why the measures to stop erosions must be mainly directed to the control of washouts and of striated erosions.

Large masses of water which collect on the bottom of hollows, in ditches, along the roads and boundaries, in the presence of easily washed out loess-like clays or sandy loams and low levels of erosion, produce deep [Begin p. 44] washouts, or, as they are usually called, gullies. An intensive washout and a striated erosion often precede the formation of gullies. The gullies fully break down the soil blanket deposit and cut into the matrix, that is the reason why control of gully

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

erosion is of such great importance to national economy.

Gully erosion is widely spread in the forest-steppe zone of the Ukraine (Chernigovskaia, Kievskaia, Sumskaia, Poltavskaia, northern part of Kharkovskaia, and other oblasti), along the central part of the river Dnepr and of its tributaries. Intensive processes of all forms of erosion are widespread also in Donbass and other regions with broken terrain.

Gullies, although of smaller sizes, are also to be found along coastal slopes of rivers and valleys in steppe regions of the Ukrainian SSR.

The more the slopes are washed away and eroded, the less moisture they are able to absorb and the more rain and thawed waters are thrown into the gullies and ravines, and the more intensively proceed the processes of erosion.

Side by side with breakdown of the soil, the products of erosion are choking up ponds, lakes, meadows, vegetable gardens and lands, which are situated in low places. Turbulent floods destroy bridges, dikes, buildings, thus bringing great damage to national economy.

Annual loss of moisture leads to a general drying out of the locality. Springs, streams, rivers, lakes, ponds, wells dry out or become very shallow.

Success in the control of erosion of soil depends on the solving of the general problem of regulation of the surface flow of summer and winter precipitations; first of all on the introduction of grass crop rotation systems in agriculture, the most important links of which are the planting of perennial grasses, agrotechnics for the control of erosion, planting of shelter belts, and a correct organization of the territory.

The prominent Russian agriculturist Academician V. R. Vil'iams attached especially great importance to the complex of agrotechnical procedures,

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

aimed to restore the fine lumpiness in the structure of the soil, which together with planting of grasses and afforestation are the most important factors for regulating the flow and enriching the soil with moisture.

The washed-out, dusty, structureless soils cannot absorb water in large quantities very fast, and the moisture which was absorbed is spent by way of an increased evaporation. Such soils are easily broken down by running waters, as well as by the wind. Thus, a restoration of the structure of the soil by means of the introduction of grass crop rotations is not only a basic method in the struggle for moisture, but also a process in the control of soil erosion.

On sections, which are subject to intensive washouts, near ravines and gullies, it is necessary to situate special soil-protective crop rotations: feed and meadow-pasture (see figure); the number of cultivated crops must be as small as possible, and the periods of grass utilizations must be increased up to 3-6 years.

Reduction of the surface flow and enrichment of the soil with moisture, together with a correct tillage of soil, is one of the effective soil erosion control measures. Hollows which are formed on the slopes during tillage of the soil by different agricultural machines and implements at an angle to the contour line of the locality contribute to the flow and the erosion. If the direction of tillage would approximately correspond to the contour line of the land, then all the furrows and ridges would become water-collecting and water-retaining "constructions" able to retain a great amount of moisture. Consequently, [Begin p. 45] tillage of the soil must be conducted at a right angle to the slope of the locality.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Title of Figure on page 45:

A layout for soil-protective measures: P-field crop rotation, L-meadow-pasture crop rotation; K-feed crop rotation. Shelter belts: 1-near-ravine 2-near-gullies; 3-4 soil-preventive; 6-6 meadows and pastures; 7-forest plantings on slopes of ravines; 7a-forest plantings at the beginning of a ravine; 8-forest plantings at the beginning of ravines and on bottoms of gullies; 9-plantings of willow stakes on bottoms of ravines and gullies; 10-improved and sodded hollows; 11 and V-forest planting in hollows; 12-field shelter belts; 13-pond. A-planting into hills; B-water-retaining ditches and embankments; Br-edge of a ravine, R-washouts, T-agricultural terraces; U-antierosion ledge of the boundary; Vd-water divide; G-contour line of the land.

It is also recommended to make broken furrows, 30 cm in depth in order to conserve moisture on the slopes. The length of such furrows should be established, depending on the character of the micro-relief, so that the ends of the furrows do not sink into hollows. With a slope of 2-3° the space between the furrows is recommended to be up to 2-3 m, and for steeper slopes up to 1.6-1 m. Furrows should not be run across hollows, but their ends turned upwards before reaching the hollows. Formation of broken furrows at the present time is done with special implements or by digging over the plow furrows by hand.

Small washouts, to a depth of up to 0.6 m on cultivated slopes often turn into slanting hollows. During the following cultivation of the soil new washouts arise on the bottom of these hollows. In order to stop

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

their turning into gullies, the new hollows can be leveled by means of plowing "vsval" [with heaping the earth]. If the newly formed washouts have a comparatively large water-collecting header and continue to grow fast, then it is necessary to stop plowing and conduct some soil improvement measures. When the flows are small and there is a large amount of products of erosion transported by them, as it also is when the stand of grass is well developed, the washouts become quickly filled with silt. [Begin p.46]

In individual cases, in order to stop washouts, one can utilize trash, manure, brushwood.

A systematic plowing of the bottom of water-carrying hollows is one of the casuses for the formation of new and for a fast development of old gullies, and also assists in the growth of erosion and of the striated washouts on adjoining slopes. One of the methods for control of such washouts is the improvement of bottoms of such hollows. Holding back the soil, which was washed off the fields helps in the leveling out and broadening of the bottom of the hollow. The streams of water which are dispersed and weakened by the stand of grass are faster and fuller absorbed under the canopy of forest plantings, situated below.

By improving the natural stand of grass, in wide bottoms of hollows, with additional sowings of perennial grasses, it is possible to obtain supplementary valuable hay mowing lands and pastures.

An example of a layout of improved sections on the bottom of gullies is shown in the cited figure.

Plantings of a forest, with a thick underbrush, on the bottom of wide, slanting gullies with small slopes can absorb a large amount of the run-off. This was graphically demonstrated by a noted Russian forester, Academician G.N. Vysotskii, by an experiment in the Mariupol'skoi

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Experiment Station, of Stalinskoi oblast'. *

Plantings on the bottom of gullies can be done in the form of long strips and thus become, at the same time, a part in the general system of field-protective shelter belts.

A complex utilization of plantings guarantees their greatest meliorating effectiveness. Besides this, such a layout of shelter belts along the currents of water gives a possibility of locating the shelter belts with some rectilinearity. The streams, which are inevitably forming along the rectilinear strips, situated at a considerable angle to the contour line of the land, enter under the canopy of plantings along water currents, where they are absorbed to a large degree, and are used to replenish ground waters, springs, and ponds.

Streams of thawed and rain waters of various sizes enter the edges of ravines and gullies. The side slopes of ravines and gullies, which have steep inclines, and in the absence of vegetation, become subject to erosion from these streams, the speed of which increases considerably below the edges of the gullies. The inclines of loess soils are especially easily broken down.

For protection of inclines of ravines and gullies from the erosive action of water and for improvement of conditions for moistening the areas above the edge of ravines and gullies it is necessary to plant forests bordering the ravines and gullies in the form of strips of various widths.

In compliance with a decree of the Council of Ministers of USSR and of TsK of VKP (b) [Central Committee of the All-Union Communist Party

* Report of the Ukrainian Scientific-Research Institute of Agroforestmelioration for 1947, Kiev, 1949

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

(Bolsheviks)] about a plan for shelter belts, the width of forest strips, contiguous to valleys or ravines, was fixed from 20 to 60 m and over. The width of strips must be determined by conditions and size of the flow which enters the slopes of ravines and gullies, taking into consideration the full complex of antierosion measures, which are being put into practice in the water-collecting header.

In those locations, where large streams are passing and formation of new washouts is taking place, the upper boundary of the forest strips must be situated on the upper limit of the starting point of the net of these washouts. The slopes and directions of such boundaries must assist in diversion and dispersion of the flow to safer sections. In those locations where, according to the relief of the land, the field flow does not enter the slopes of ravines or gullies the width of strips should be less than 20 m. Near precipitous inclines of gullies [Begin p.47] the width of strips should be not less than the width of the natural soddy and afforested incline under the given soil-geological conditions.

Directions for arrangement of boundaries for such sections are cited in a journal "Sovetskaia Agronomiia", no. 2, 1949, in an article by K. L. Kholupiak "Correct arrangement of boundaries for agricultural lands and control of soil erosion".

Holding back a large part of thawed and rain waters is only possible under conditions of a correct arrangement of bounderies of plantings contiguous to ravines and gullies.

On level, slopy inclines the agrotechnics for the formation of plantings bordering the ravines and gullies does not substantially differ from sowing or planting of field-protective shelter belts, with one exception, namely that of filling such plantings, especially in places of downfall of the flow, with a variety of bushes.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

On highly broken slopes, where a continued tillage of the soil is possible, it is necessary to conduct plantings or sowings of the forest trees in furrows. In individual cases, where furrows cannot be made, the planting or sowing of trees is conducted on dug up terraces 1-2 m long and 0.5 m wide. These areas should be laid out in chess-board order.

On precipitous inclines of hollows and on their bottoms, plantings or sowings of a forest should be made on areas measuring 0.5 m x 0.5 m or 0.3 x 0.3 m.

The slopes of gullies, as well as of ravines, which undergo erosion, as a rule, are subject to afforestation (on the figure these plantings are cited under numbers 7 and 8).

Slanting, flat slopes of ravines, especially of northern exposure can be remade by means of improvements into valuable hay-mowing lands as well as pastures.

On slopes of western exposures it is necessary to propagate forest-fruit and forest-technical plantings, and, where terrace tillage is possible, cultivated orchards and berry patches. In southern oblasts of the Ukraine, on southern, especially chalky slopes, grapes are grown very successfully.

In conditions for afforestation and improvements the southern slopes sharply differ from the northern. On washed out and eroded slopes of gullies, even in Briansko-Tchernigovskoi forest-steppe, the temperature during the summer months reaches more than 50-60° at 18-20% of relative humidity of the air near the ground. Under such conditions not only afforestation of the slopes, but even their natural sodding is hampered. Accomplishment of water-regulating measures above the edge of ravines and gullies will certainly improve conditions for afforestation of

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

precipitous inclines, especially on the southern exposure.

Planting or sowing of trees and bushes on inclines with a slope of more than 15-30°, which are criss-crossed by washouts can only be done in nests, on small areas, or on terraces.

Experience has shown that sowing of the basic variety of oak, in order to restore the high-productiveness of forests, especially in ravines and gullies of the forest-steppe zone, has proved its value and can be widely recommended.

Afforestation and improvements on the bottoms of ravines and gullies are done depending on the character of the erosion processes.

The wide, flat bottom of ravines, which is not being washed out by streams of water, is usually rich in alluvium. With a sufficient moistening, the bottoms of such ravines represent wonderful meadow lands. It is not recommended to conduct plantings, especially of trees, on bottoms of ravines which are being washed out, or on a deepening bottom of a gully, which is not yet fully settled, [Begin p.48] because the trees will narrow the size of the stream, this will lead to an increase in its speed and of its eroding capacity.

In those places, where deepening of the bottom has stopped, the tree and bush plantings on the bottom tend to disperse and weaken streams; the result of this is a precipitation of large quantity of products of erosion. At such times the bottom is widened and becomes covered with natural grassy vegetation. The thickness of sediment on the bottom can reach over 1 m, that is the reason why afforestation must be done with such tree-bush varieties which are able to stand siltation. Willows and poplars are especially good at bearing siltation! These varieties are usually planted as cuttings, 0.5 m long and up to 1 cm wide, or by saplings of a diameter up to 5-7 cm. The planting is

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

usually done in spring after the flood. Black alder usually grows very good in places where the ground waters are escaping.

After the establishment of a comparatively constant profile, such varieties as oak, maple (Acer platanoides L.), ash, plane tree, and others are introduced into the composition of plantings.

Very simple hydrotechnical constructions, such as dikes and fencing, are also used for the improvement of forest-growing conditions and for a quicker consolidation of the bottom of ravines and gullies. In gullies with rocky bottoms, afforestation is often impossible without silt retention by some installations. The flatter the slope of the bottom of the gully the more effective are these installations.

The presence of a large number of washed out and eroded inclines is characteristic of regions of strong erosion. A thick net of deep gullies, which formed on places of washouts, as well as new washouts make such slopes unsuitable for cultivation of agricultural crops.

A further working of such sections, when utilizing the usual agrotechnics of field crop rotations, leads to a sharp reduction of their fertility and transfers them into the range of so-called "worthless lands".

At the same time, with an appropriate protection of such sections from further erosion, as well as with the use of special methods of soil tillage, these lands can be effectively utilized for growing valuable orchard - berry crops.

Tillage of the soil for the planting of fruit trees and bushes, as well as the care for them, must be conducted in strips, which are situated as nearly as possible approaching the contour line of the land. Between these strips of cultivated land strips for constant sodding must be left which in 5-10 years will become natural sodded terraces as a

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

result of sedimentation of products of erosion.

In those places where the washouts or the hollows have a depth of more than 40-50 cm, gaps must be left when plowing, and the washouts must be leveled and sown to grass.

If a slope is divided by a net of hollows and washouts, planting of trees is done in hills (A).

When the slopes are thickly broken by washouts it is possible to plant forest-technical crops, choosing varieties which will suit the natural historical conditions of the locality as well as the purpose for planting ("funduk" [a variety of nut], hazelnut, dog rose, and others).

Finally, when the necessity arises to widen the forest plantings, this section can be fully afforested. Yet the lack of plowed areas in strongly eroded regions does not always allow the conduct of full afforestation. Even a partial plowing of an intensely eroded slope, in the presence of considerable water-collecting headers requires the formation of special soil-protective forest strips (4). Such strips must guarantee dispersion and absorption of streams of the field flow; [Begin p.49] their width can be up to 60 m. Further widening of the strip is inexpedient. In the case of requirement to strengthen the water-regulating and soil-protective effectiveness of the forest strip in the lower part of the plantings, it is necessary to build some simple hydrotechnical constructions as ditches and embankments (B) to stop the streams of water, which have overcome the resistance of the upper part of the strip.

Such a combination of a forest and of the simplest constructions, as the experience of many years standing has shown, is very effective, because under the protection of plantings the time of action of these constructions is increased through siltation.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The moisture, which is held back by the shelter belts and the constructions under favorable geological conditions, goes into moistening the lower part of the slope, as well as for replenishment of ground waters. A full intake of moisture by the soil-protective strip is especially favorable to the formation of natural terraces when the tillage of slopes is done in strips. The well formed terraces make it possible in the future to utilize them for the cultivation of agricultural crops.

The less intensive is the tillage of the slope and the weaker are the erosion processes the narrower can the soil-protective strip be. Yet, it should not be less than 20-30 m. Such strips (3) are formed along the upper boundaries of feed and meadow-pasture crop rotations. To have a constructive effect the soil-protective forest strips must be characterized by the presence of a uniform, thick underbrush.

The upper boundary of these strips must be situated higher than the tops of the basic net of hollows and washouts, when their depth does not exceed 30-35 cm. In the presence of a deeper and thicker net of washouts and hollows, the width of the strips must be increased, and they must be strengthened by water-retaining constructions. Under dry conditions the retention of moisture by ditches and embankments facilitates considerably the plantings and lengthens the period of their life. This latter fact relates especially the chestnut soils in the dry zone, in the southern Ukraine.

Agrotechnics for the creation of soil-protective forest strips on level sections of the slopes, by planting or sowing, differ but little from those used for field shelterbelts. Under conditions of washouts the cultivation of the soil must be conducted in the form of strips, terraces, and nests. Large washouts must be afforested with such root-spreading

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

varieties, as black locust, and the bottom of hollows with bushes.

It is known that one of the most important causes for erosion is a wrong allocation of permanent boundaries to agricultural lands, including forests. On inclines with large slopes and water-collecting headers, new gullies often arise along permanent boundaries, which are situated at an angle to the general slope of the locality. This must especially be taken into consideration when decision is made about setting permanent boundaries for plantings, which are bordering the gullies.

In order to evade a concentration of large streams along some of the long sections of boundaries, longitudinal slopes of the latter ones must be changed by means of some slight curves, or in a form of ledges (U), as it is diagrammatically shown on the figure. On this horizontal ledge the flow, which originated along the higher situated section of the boundary, will be thrown off into the plantings in a dispersed state. In case of danger of formation of a new washout below the ledge of the boundary, water-retaining embankments and ditches are constructed under the cover of shelter belts.

As a rule, the soil-protective, water-regulating shelter belts must situated on a slope in such a manner that streams of water do not collect along their boundaries, and the flow would enter in as wide a manner as possible [Begin p. 50] under the cover of plantings. This is easily achieved under conditions where the horizontally situated sections of boundaries are taking turns with sections having slight slopes (up ot 2°), as the even breaks in boundaries on watersheds, are counter in relation to the curves of the contour lines of the land.

This principle of laying out the plantings has been established by us on a basis of a deep study of the water-regulating role of shelter

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

belts in kolkhozes and sovkhozes of Kharkovskoi, Stalinskoi, Chernigovskoi and other oblast' in Ukraine, as well as on Mariupal'skoi and Vladimirskoi Experiment Stations.

Accomplishment of the whole complex of the water-collecting and soil-protective measures on the slopes will enrich the locality with moisture. However, that part of atmospheric precipitations which will be held back on the water-collecting header and will not be absorbed by the soil, must be collected into ponds and reservoirs.

In regions where gully erosion is wide spread, it is necessary to give serious attention to the choice of the location for a pond. The largest of water reservoirs become easily choked with silt and destroyed, if products of erosion will enter these reservoirs in large amounts. In order to evade this, it is necessary to locate ponds (13) on the bottom of wide, sloping ravines, higher than are the basic seats of erosion (as it is shown on the figure) and, together with this, to conduct afforestation and sodding of the slopes and of the bottom of the ravine above the pond.

If, for some reason, the pond must be constructed below the active gullies, they must be braced by means of afforestation and by simple constructions.

Siltation and destruction of the pond is especially undesirable under steppe conditions, where there are so few places available for making a pond in view of the flatness of the ground. Reclaiming a silted pond with a broken dike usually costs more money than construction of a new one.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-764
(In full)
db/A

Bondarev, A.A.

Unichtozhenie sorniakov v posevakh kukuruzy gerbitsidom 2,4-D.

/Weed eradication in maize plantings with 2,4-D herbicide/.

Zemledelie, vol. 4, no. 3, pp. 107-108
March 1956 20 Z44

(In Russian)

A 764

On the "Zaria" swine breeding sovkhoz, Kemerovo Province, the area cropped to maize has increased in the last two years from 60 ha to 757 ha. Practice of past years has convinced us that the yield of maize depends on care of the plants and primarily on successful weed control, especially in the first period of maize development. In mechanized interrow tillage of check-row plantings the farm cannot dispense with hand weeding of the hills, which in cases of labor shortages incurs the risk of accomplishing this work too late and, in the end, imperils the yield of maize.

Our experience has demonstrated that spraying plantings of spiked cereals with 2,4-D herbicide permits timely weed eradication on large areas at a slight consumption of manpower. To clarify what doses of the 2,4-D preparation, noxious for dicotyledon weeds, will be harmless for the maize plant and at what stage of maize development it is best to apply

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

this method, we conducted extensive tests of the new method in 1955 on an area of 160 ha.

Chemical weeding on plantings of Sterling Kubanskii and Dnepropetrovskaia Zheltozernaia maize was conducted on some plots in the phase of 4--5 leaflets (16th of June), on other plots - 29th of June, and on the third group of plots - July 14, i.e. before the growth of the plants became vigorous. Tests were made of doses of 700 gr, 900 gr and 1100 gr of the 2,4-D preparation in 100 liters of water per ha (the technical preparation contains 68--69% of the active element). Our experiments have demonstrated that the 1100 gr per hectare dose is entirely adequate for chemical weeding of maize. When plantings were sprayed with 2,4-D in the dose indicated, all dicotyledon weeds were eradicated, yet the development of maize plants on plots where chemical weeding was conducted was exceptionally good (they were no different from the plants grown on plots where the most careful hand weeding had been carried out).

On the third day after spraying with 2,4-D, horsetail [Equisetum arvense] dried up and subsequently, for a period of almost 1.5 months, failed to grow or to produce new shoots. Yellow thistle and Canada thistle rolled up badly by the 3-5th day, and after 2--3 weeks 75--90% of these weeds perished completely, the other 10--25% of the plants were strongly depressed.

Tartary buckwheat, orache [Atriplex], amaranth, Barbaraea [surepka] and other dicotyledon weeds, with the exception of European bindweed [Convolvulus arvensis] and hemp nettle [Galeopsis], perished 2--3 weeks after the spraying. The latter continued to flower and to bear fruit despite inhibited growth.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Thus, the fundamental mass of weeds in maize plantings perished within the first two weeks following the spraying. The new shoots of yellow thistle and blessed thistle [Onicus benedictus] which appeared in the middle of August failed to develop normally and to set seed before harvest. [Begin p. 108].

It must be noted that blessed thistle and yellow thistle were more depressed during the booting phase (following the June 29th treatment of plantings). Upon treatment conducted during this period on a plot where each sq meter had 14 plants of yellow thistle and blessed thistle, these plants perished almost completely, while upon treatment of plantings conducted on June 16, when these weeds were in the rosette phase, some of them continued to vegetate. Chemical weeding was not reflected in maize growth. Thus, on the plot where chemical weeding had been conducted on June 29th maize plants of the Sterling variety reached a height of 140--170 cm, while on the control plot (without weeding of hills) they reached 95--120 cm. Yield of the green mass with the ears harvested on the experimental plot on September 15 comprised 363 centners, including 47 centners of ears, while on the control plot where very few ears had set, the total weight was only 136 c per ha.

On the basis of the experiment conducted on the sovkhoz, 2,4-D herbicide can be recommended for chemical weeding of maize plantings in doses determined by local conditions and the maize varieties to be planted.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Trans. A-765
(In part)
vg/A

Shchegolev, V. N. ed.

Slovar'-spravochnik entomologa.

[Entomologist's glossary and reference book]

Moscow, Gosud. Izd. Sel'skokhoz. Lit. 1955. 461p. 422.02 Sh2

(In Russian)

BOGDANOV-KAT'KOV, NIKOLAI NIKOLAEVICH (1894-1955).

Professor, Dr. of the Agricultural Sciences, eminent scientific worker of the RSFSR - famous entomologist, founder of the Institute of Applied Zoology and Phytopathology. The son of a railroad worker born at Novorossisk. Graduated from the physico-mathematical faculty of the University of Petersburg and from the Leningrad Agricultural Institute. B.-K. became a science teacher in 1913. He taught the subject of plant protection in a number of Leningrad universities, and directed IZIF [tr: probably Institute of Zoology and Phytopathology] uninterruptedly from the time it was organized (1922) until 1948, serving simultaneously as Director of the Pushkin Agricultural Institute. B.-K.'s scientific-research work was directed toward the study of truck crop pests and sweet potato pests, toward the compilation of abstracts of agricultural pests, of text-books, and toward investigation of new preparations and their adaptation to production for the control of noxious insects (anabasine, DDT). B.-K. published 130 scientific works. For a number of years B.-K. headed the Section of Plant Protection of the All-Union

17
765

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Lenin Academy of Agricultural Sciences im. V.I. Lenin. He was awarded citations of the Workers' Red Banner, the Mark of Distinction, and medals.

Literature. Kuznetsov, N. Ia. Sketch on the life and activities of Professor Doctor N. N. Bogdanov-Kathkov, Izv. VKPZiF, no. XII, 1941.

* * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

BOLDYREV, VASILII FEDOROVICH. (1883-))

Professor, Doctor of Agricultural Sciences, eminent scientific w worker of the RSFSR, prominent scientist in the sphere of entomology. He was born in 1883 at Saratov. In 1901 he entered the University of Moscow from which he graduated in 1906 with a Diploma of the First Degree for the Department of Natural Sciences of the Physico-Mathematical Faculty; here his bent for the natural sciences found fertile soil for further development under the influence of Professor N. M. Kulagin, Prof. G. A. Koshevnikov, Prof. M. A. Menzbir, Prof. N. I. Zograf, Prof. K. A. Timiriazev and others. Specializing in zoology and particularly in entomology, Boldyrev, while still a student, completed a work on the biology and anatomy of May flies which was published in the form of a newspaper report in 1904, and in the form of an article in 1909. Upon his graduation from the University in 1906, the Moscow Agricultural Institute (now the Moscow Lenin Order Agricultural Academy im. K.I. Timiriazev) selected him as a supernumerary scholarship student (i.e. aspirant) for the chair of zoology, and from November 1907 until 1920 he was the assistant of Prof. N. M. Kulagin for entomology of the given chair. In 1920 an independent chair of agricultural and forest entomology was organized from the staff of the zoological chair of the Academy, and Boldyrev became its professor and director, serving from October 1920 until September 1, 1954 without a break. From 1910 until 1920 he was also instructor and director of the Chair of Agricultural Entomology for Agricultural College Courses for Women (formerly Golitsyn Courses) in Moscow. In 1922 he lectured on forest entomology at the Moscow Forest Technology Institute, and from 1923 through 1926 he directed

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

the Chair of Forest Entomology at the Moscow Forest Institute. Boldyrev's research work covers various aspects of entomology. His excellent works on the biology of insect reproduction (particularly on spermatosphore fertilization), especially in Orthoptera, became very famous and were awarded in 1917 the prize im. P. P. Semenov-Tian-Shanskii by the Russian (now-All-Union) Entomological Society. In the years 1922-1924 the first investigations for the use of airplanes in plant protection (pest control, inspection of their nidi) were conducted under his guidance and with his personal participation in the experimental work which laid the foundation for the subsequent wide-spread development of the aviochemical control method. A series of his works was devoted to the study of biology, the economic importance and measures of insect pest control, particularly in hothouses and nurseries, and in food warehouses. The two-volume textbook "Fundamentals of Crop Protection against Pest and Diseases", published in 1936, was edited by him and contained his personal contributions; the same is true of the textbook "Control of Crop Pests and Diseases" published for Communist agricultural colleges (1933) and translated into the Ukranian (1934) and the White Russian (1935) languages. His published works number over 100. His social work dealt chiefly with a set of problems connected with the training of personnel and with the organization and strengthening of plant protection in the USSR. For his outstanding work in the sphere of agricultural sciences, Boldyrev in 1942 was conferred the title of Honorable Worker of Science of the RSFSR, and in 1953 he was elected Honorary Member of the All-Union Entomological Society. He was one of the active founders and the secretary of the Moscow Entomological Society (1914-1924).

[Article includes a partial list of Boldyrev's works and references].

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

VASIL'EV, IVAN VASIL'EVICH (1871-)

Professor, Doctor of the Agricultural Sciences, one of the oldest entomologists who, in more than a half-century of scientific work, has given much that is valuable to agricultural entomology. Vasil'ev was born in 1871 at Petersburg. He received his higher education at the Petersburg Institute of Forestry (Academy of Forestry Technics im. S. M. Kirov at Leningrad [Lesotekhnicheskaia akademiia im. S. M. Kirova v Leningrade]) where he worked under the guidance of Professor N. A. Kholodkovskii and his assistants I. I. Shevyrev and A. A. Silant'ev. Later, Vasil'ev finished a course at the Moscow Agricultural Institute (now Moscow Agricultural Academy of the Order of Lenin im. K. A. Timiriazev), where he worked under the guidance of Prof. N. M. Kulagin.

For a considerable length of time (from 1901 through 1917) Vasil'ev worked as a specialist of the Bureau of Entomology on the Scientific Committee of the Ministry of Agriculture. During this period Vasil'ev published a series of valuable works many of which have retained their importance up to now. The list of his works of this period includes his investigations of the pierid butterfly [boiarishnitsa - Aporia crataegi], the cereal beetle, alfalfa pests, the melon aphid, the spider mite [Tetranychus urticae], noxious Eurygaster, the pine and cedar silkworms and cotton pests. In addition, Vasil'ev from 1918 through 1925 worked as a specialized scientist in the Department of Applied Entomology of the State Institute of Experimental Agronomy, and from 1926 until 1933 in a number of other experimental entomological institutions. From 1933 on, Vasil'ev's scientific work was devoted entirely to VIZR [All-Union Institute of Plant Protection] where he served as a specialist; later

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

(after the death of N. F. Meier) he was in charge of the laboratory of biological control methods. During this period Vasil'ev's work concerned principally the bean weevil and the pea weevil. While he investigated the latter species, he discovered and described Iatromeris [Iiatromeris - Iatromeris bruchicida Vas], a parasite of the weevil.

Vasil'ev is the author of a number of practical measures which are widely utilized. In particular, he initiated the biological method of Eurygaster control with the aid of egg parasites [parazit-iaitseed]. He was the first one in Russia to study the pests of alfalfa, lupine and cotton, and he developed many methods for their control. Vasil'ev was the first one to recommend extermination of malaria mosquitos by dusting water bodies with Paris green, and extermination of mosquito larvae with the aid of viviparous fish of the Gambusia and other species.

His excellent knowledge of many foreign languages and his great diligence have made Vasil'ev one of the most erudite entomologists. His published literary surveys on a number of species of noxious insects, and his constant consultations which he refused to no one have given much to science and to practice.

By the end of 1954 Vasil'ev's published works on various entomological problems numbered over 100.

LITERATURE. Gusev, V. I. A significant date (to the 50th anniversary of the activities of Doctor of the Agricultural Sciences, I. V. Vasil'ev), Proceedings of the All-Union Institute of Plant Protection, Leningrad, 1949.

*** *** ***

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

ZAKHVATKIN, (IAZYKOV) ALEKSEI ALEKSEEVICH (1906-1950)

AZakhvatkin was a well known and talented representative of the Soviet biological school, with a creative genius for the sciences and for teaching. The gifts of the careful observer of living nature, of the brilliant morphologist, taxonomist and evolutionary biologist, of the highly erudite pedagog and excellent artist were happily combined in him. Exceptionally industrious and of an inquisitive mind, Zakhavtkin entered the University of Moscow at the age of 14 while still an [elementary] student. Within the walls of this university passed the last, particularly significant years of his life cut short at the peak of his tireless, creative pedagogic and social activities. His first instructors and science directors in zoology were the professors G. A. Kozhevnikov, E. S. Smirnov and I. I. Ezhikov. In 1926, after graduating from the Biological Department of the Physico-Mathematical Faculty of the University of Moscow, Zakhvatkin transferred to a Central Asian plant protection station where he conducted a series of difficult expeditions (Uzbek, Turkmen, Tadzhik SSR) investigating parasites of noxious Locustidae. During these years he published a series of works on the biology, morphology and economic importance of the parasites of water lilies [kybyshka].* These works explain the new characteristics of parasite organization and the law of their development and of the development of insect hosts. He continued his investigations of the parasites of Locustidae until 1935, in Azerbaidzhan, Eastern Siberia and in North Caucasus. In 1933, following an invitation from the Scientific-Research Institute of Zoology of the University of Moscow,

* Tr. note: Could also be a "holothurian", a sort of sea invertebrate.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Zakhvatkin moved to Moscow and conducted here the first investigations of pests of technical wood, and in the year of 1934 he began a study of granary mites and of measures for their control. In 1935 Zakhvatkin defended his candidate's dissertation, and in 1939 the dissertation for his doctorate on the topic of "Investigations of storage (tyroglyphid) mites". Two years later Zakhvatkin is conferred the professorship for the Chair of Entomology at the University of Moscow. In 1941, he and Prof. Z. S. Rodionov were simultaneously awarded the Stalin prize of the 2nd degree, and in 1947 he was received into the ranks of the Communist Party of the USSR. In 1948 Zakhvatkin became Deputy Dean of the Biological Faculty at the University of Moscow, and in 1949 he was appointed Director of the Zoological Scientific-Research Institute.

Zakhvatkin's scientific activities, with all their diversity, can be summarized along the following lines. Investigations in the sphere of taxonomy and morphology of Homoptera (cicadas) to which he devoted 19 works published during the author's lifetime, and 5 works published posthumously. Soon after he began these investigations, Zakhvatkin became famous as a Homopterist. In addition, Zakhvatkin carried on scientific work on mites in which he was interested up to the last days of his life.

His taxonomic and morphologic investigations Zakhvatkin conducted on the basis ontogenetic characteristics of Arachnida [arakhnoidei], dwelling specifically on the problems of their embryonic and postembryonic development. The primitive trilobite character of the tagmosis [tagmozis] of actinochitinous mites, important from the viewpoint of comparative morphology and taxonomy of Arachnida, is found to be profoundly distinct

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

from tagmosis of the group of Parasitiformes mites of the Arachnida type.

Wide-spread investigations in diverse biological spheres were the basis for Zakhvatkin's numerous conclusions which are of principal importance in the taxonomy, embryology and morphology of arthropoda.

His monographs - "Tyroglyphid mites" (1941) and "Investigations of the morphology and postembryonic development of tyroglyphi" (1953) are valuable abstracts of the problems touched upon and, at the same time, original works in the spheres of morphology, ontogenetic development, phylogenesis and taxonomy of mites. In the classification of mites, Zakhvatkin carefully reevaluated large taxonomic categories providing them with a scientific legend [oboshovanie].

These problems are touched upon also in his other works - "Evolution and morphologic legend of taxonomy of mites" (1952) and the "Division of mites (Acarina) into orders, and their position in the taxonomy of Chelicerata" (1952).

Dealing, subsequently, with comparative morphology and the characteristics of insect and mite ontogenesis, Zakhvatkin in his last years included other groups of invertebrates in the orbit of his investigations which resulted in the monograph "Comparative embryology of lower invertebrates" (1949), awarded the Stalin prize after the author's death. This work has great scientific value and is simultaneously a required textbook.

The homopterous works of Zakhvatkin, like all of his other scientific works, are distinguished by a wealth of material, accuracy and novel data. Apart from describing many new species, the author dwells on h the characteristics of the anatomy and ecology of this group of insects.

Forty seven of his works - 19 of which were devoted to cicada, 16 to mites, 7 to problems of insect parasitism, 2 to embryological,

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

and the rest to other biological problems - were published during the author's lifetime. After his death another 17 of his works were published in his "Collection of scientific works" including some of the courses he read at the University of Moscow.

AZakhvatkin died ain Moscow, on December 14, 1950, at the age of 44, after a short but serous illness. His life ended at a time when his creative power, his social and pedagogical activities were in full bloom.

[Tr. note: There is a bibliography of the author's principal works and of articles on his life].

KUZNETSOV, NIKOLAI IAKOVLEVICH (1873-1948)

Professor, Doctor of the biological sciences, famous Soviet entomologist and physiologist. Graduated from the University of Petersburg in 1895, in which he worked from the year 1896 under Prof. N. E. Vvedenskii at the Chair of Physiology on general problems of muscle-nerve [nervno-myshechnaia] physiology. In 1905 Kuznetsov transferred to the Zoological Museum of the Academy of Sciences where he worked for 43 years. Here he conducted diverse investigations in the sphere of taxonomy, morphology, paleontology and the geographical distribution of insects, particularly of Lepidoptera. From the year 1930 Kuznetsov headed the Laboratory of Insect Physiology in the All-Union Institute of Plant Protection.

Parallel with his scientific work, Kuznetsov was doing fruitful work as a lecturer and later as a professor at the University of

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Leningrad (general and comparative physiology and physiology of insects), at the Institute of Applied Zoology and Phytopathology (general entomology and physiology of insects), at the Leningrad Agricultural Institute ((physiology) and at a number of other educational institutions.

Kuznetsov published over a 100 scientific works many of which have played an important role in the development of native entomology. Among his outstanding monographic investigations are: 1) the two-volume Introduction to the fauna of Lepidoptera of the USSR (1915-1928), which is a basic reference work on the morphology, taxonomy and geographical distribution of this group of insects; 2) abstract of "Arctic Fauna of Eurasia" and its origin (1938) which is a general outline of the results of the author's 20-year investigations in this sphere; 3)the monography "Lepidoptera of Amber" (1941) which was awarded the im. N. A. Kholodkovskii prize; 4) "Basic Physiology of Insects" (vol. 1 - 1948, vol. 2 - 1953) - a substantial work comprising a critical and most complete abstract of this division of the entomological science. Apart from a large number of works on the taxonomy of Lepidoptera, Kuznetsov published a number of investigations devoted to zoogeography and to various problems of the biology and ecology of insects.

Kuznetsov took his editing duties and compiling of popular editions very seriously. He was one of the founders, the editor and an active contributor of the "Entomological Review [Entomologicheskoe obozrenie]" journal. For a long time he had in this journal a critical and bibliographical section in which he published several hundred reviews and abstracts. Kuznetsov translated, supplemented substantially and revised D. Sharp's "Insects" which until now has lost none of its importance.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Kuznetsov was an honorary member and a Vice-President of the All-Union Entomological Society. For his many years of scientific and pedagogical service he was awarded the Order of the Red Labor Banner.

* * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

KULAGIN, NIKOLAI MIKHAILOVICH (Nov. 15, 1859-Mar. 1, 1940)

Academician, eminent scientific worker and outstanding zoologist who has done much for the development of entomology in the USSR. Kulagin was a student of the Physico-Mathematical Faculty of the Moscow University. Upon his graduation from it (1884) he became an assistant and later a custodian of the Zoological Museum under the direction of the most important zoologist, A. P. Bogdanov. Six years after his graduation from the university, Kulagin defended his Master's dissertation "Materials on the natural history of rainworms found in Russia" at the University of Petersburg, upon which he was confirmed as a university lecturer [prisiatdozent] of the Moscow University where he lectured in zoological courses on invertabrates. In 1895 he was conferred the degree of Doctor of Zoology.

He served as pedagog at the university 21 years, up to 1911 when he and many other scientists ceased lecturing as a sign of protest against Kasso, the reactionary Minister of Public Education, Kulagin returned to the University of Moscow as a professor after the Great October Revolution, and worked there from 1919 until he died. At the university he was the first to lecture on applied entomology and he founded the Chair of Antomology. Besides the Moscow University, Kulagin conducted pedagogical and social work at the Moscow Agricultural Institute (now the Moscow Lenin Agricultural Academy im. Timiriazev) where he served as a professor from 1894 in the Chair of Zoology lecturing on zoology and agricultural entomology. He lectured also at the People's University im. Shaniavskii (from 1912 until 1922) where he was dean of the Department of Natural History. In 1918 [tr. note: probably 1923 or 1931] Kulagin was elected corresponding member of the Academy of Sciences,

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

USSR, in 1932 - active member of the White Russian Academy of Sciences and active member of the AAll-Union Academy of Agricultural Sciences (VASKHNIL). There he directed the Section of Plant Protection and was the organizer of and permanent delegate to many All-Union entomological conferences and plenums of the VASKHNIL Section of Plant Protection, and an active organizer of and contributor to entomological periodical publications. He was Chariman of the Moscow Entomological Society from 1914-1925. In all of his work, Academician Kulagin skillfully combined theoretical investigations with a lot of practical work. Kulagin is the author of numerous works on zoology, bee keeping and agricultural entomology. His extensive abstract "Injurious insects and their control" was for a long time the reference book of every entomologist. The sum total of his works published by 1935 compraised 229 titles, and the total of his published works numbers about 300 (see Zoologicheskii zhurnal, v. 19, no. 4, 1935).

[Article includes a list of Kulagin's principal works and references on himself].

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

MEIER, NIKOLAI FEDOROVICH (1869-1946)

Famous Russian entomologist, one of the organizers and first director of the laboratory of the biological method of control at VIZR [All-Union Institute of Plant Protection]. He first worked on the morphology, biology and taxonomy of the Ichneumonidae family. Meier's first works (1926) on the immunity of caterpillars to their parasites aroused much interest. A monumental key to parasitic Hymenoptera (Ichneumonidae fam.) in 6 volumes compiled by Meier is the first abstract of information covering the whole large family of Ichneumonidae. In the late 20-ties Meier's attention was attracted by problems involving utilization of parasitic insects for biological control of pests. He compiled the first lists of Ichneumonidae developed from noxious insects (1927, 1929). Later, on Meier's initiative, there followed the first successfuly experiments in the use of parasites introduced into Russia (Aphelinus mali Hald. against the woolly apple aphid [Eriosoma lanigerum Haus. - krovianaia tlia]) and of predators (Rodolia cardinalis Mils. against Icerya [purchasi Mask. - itseriia] and Cryptolaemus mountrouzieri Mils. against mealybugs [Pseudococcus - muchnistyi chervets]). In the early thirties a laboratory for the biolgoical method of control was organized at VIZR and Meier seved as its Director for the rest of his life. From the year 1935 Meier devoted much attention to Trichogrammatidae, first for the control of the lesser apple worm, and later for that of the winter moth [Euxoa segetum Schiff. or Agrotis segetum Schiff. - ozimaia sovka] and other pests. Before the Patriotic War, Meier was using egg parasites - Telenomus [Scelionidae family] in the control of Eurygaster integriceps. In the war years, when Meier was in Central Asia, he developed methods of

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

the use of Symphérobius in the control of Comstock's mealybug [Pseudococcus comstacki]. In all of his works Meier combined the rich erudition of the taxonomist and biologists with the practical skill and energy of the organizer. He laid the foundation for the use of insect-entomophages for biological control of pests. [There is a list of his principal works].

* * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

PAVLOVSKII, EVGENII NIKANOROVICH (1884-)

Academician and outstanding Soviet scientist in the fields of parasitology and biology, head of a number of biological scientific-research institutions and active social worker. He was born on March 5, 1884, at Biriuche, Voronezh Oblast. In 1903 he entered the Military Medical Academy at Petersburg where he attracted the attention of the very important zoologist and entomologist, Prof. N. A. Kholodkovskii, under whose direction he completed a series of works on parasitology and on the study of poisonous animals. His early scientific works he wrote while still a student; in 1908 one of these was awarded the gold medal of the Military Medical Academy. He finished the Academy in 1909 and, , in addition to having been awarded a prize, his name was entered on a marble plaque. In 1912 he was appointed assistant, and in 1913 selected as a university lecturer [privatdotsent - is paid a fee but no salary] of the Chair of Zoology and Comparative Anatomy of the Military Medical Academy. His dissertation "Materials on Comparative Anatomy and history of the development of scorpions", which he defended in 1916 for his Master's degree in zoology, was awarded the prize imeni Akhmatov by the Academy of Sciences. Pavlovskii's career began to blossom out after the Great October Socialist Revolution. After the death of Prof. Kholodkovskii in 1921, he was elected Director of the Chair of Zoology and Comparative Anatomy of the Military Medical Academy whose permanent chief he still is. In 1924 he published his "Rukovodstvo k prakticheskoi parazitologii cheloveka [Handbook of practical parasotology in man]" which, after a number of reissues, has developed into the important 2-volume work of "Handbook of parasitology in man" (1946, 1948); the 2nd volume of this "Handbook" has been awarded the Stalin prize of the 1st degree. Pavlovskii

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

has organized more than 160 expeditions to various parts of the USSR and also to neighboring countries for the purpose of making a study of disease carriers and of parasitic diseases in man and domesticated animals; the principle of team work was extensively fulfilled in the investigations which helped to solve the most difficult problems of theory and practice speedily and thoroughly. As a result, the sources responsible for spreading dangerous diseases of man - tick and mosquito encephalitis, tick typhoids, tularemia etc. were revealed. For his investigations of Siberian forest tick encephalitis Pavlovskii, in 1941, was awarded the 1st degree Stalin prize. An outstanding theoretical work of general interest [obobshchenie] is Pavlovskii's study of "natural nidi" of transmissible diseases, i.e. diseases carried by insects and ticks, which is of great significance to practical medicine and veterinary medicine, particularly in the adaptation of new territories; for his treatment of this study, the Presidium of the Academy of Sciences, USSR, awarded Pavlovskii the gold medal imeni I. I. Mechnikov. In addition to his rank of Academician of the Academy of Sciences, USSR (elected in 1939), Pavlovskii is also an honorary scientific worker of the RSFSR [Russian Soviet Federated Socialist Republic] and of the Tadzhik SSR, an active member of the Academy of Medical Sciences, USSR, an honorary member of the Academy of Sciences of the Tadzhik SSR, an honorary member of the Iran Academy of Sciences, an honorary Doctor of the University of Delhi (India) etc. He is also the President of the All-Union Entomological and All-Union Geographical Societies.

[Article ends with a short list of references].

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

PLOTNIKOV, VASILII IL'ICH (1877-)

Doctor of the biological sciences and a professor. Was born in 1877 at Tomsk. Upon graduation from the Real'noe Uchilishche [Realistic (secondary) School with a preponderance of mathematics and the natural sciences, but without ancient languages] he entered the Petersburg Institute of Forestry (now the Forest Technological Academy im. S. M. Kirov) from which he graduated in 1901. On the recommendation of Prof. N. A. Kholodkovskii, Plotnikov, while still a student, worked for two years at the Bologov Biological Station and published several works on the fauna of worms. His work "Insect molting" which he completed under the guidance of N. A. Kholodkovskii was awarded a gold medal by the Council of the Institute.

Upon his graduation from the Institute, Plotnikov worked as a conservationist for the Chair of Zoology and Comparative Anatomy of the Military Medical Academy (now im. S. M. Kirov), and from the year 1908 in the laboratory of the Forestry Department where he studied insects injurious to woods under the direction of I. Ia. Shevyrev. Upon the latter's recommendation he was appointed in 1911 Director of the Turkestan Entomological Station in Tashkent. For about 20 years Plotnikov conducted a study of noxious entomofauna in Central Asia, and published during that time a series of works on Locustidae on the pine measuring worm [Geometridae], the mountain bug [gornyi klop - Dolycoris penicillatus Harv.], and on cotton pests. He has compiled an excellent abstract on noxious insects of Central Asia. Plotnikov's works which present much interest are those on phasic variation in Asian locusts, on the growth regularities of forest clearings of the

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Moroccan locusts, and on the migration of the mountain bug. The Government of the Uzbek SSR valued Plotnikov's work highly and conferred on him the honorary title of a Hero of Work.

Beginning with year 1918, Plotnikov served as a pedagogue in a number of colleges. From 1918 until 1931 he was teaching entomology at the Central Asian State University, in 1932-1933 he taught zoology at the Agricultural Institute of Horse Breeding in Piatigorsk, from 1933 until 1936 he instructed in entomology at the Bashkir Agricultural Institute, and later returned to Tashkent where he lectured until 1941 in a course of histology [gistologiia] and embryology at the Central Asian State University. Since June 1945 Plotnikov has been heading the Chair of Plant Protection of the Lvov Agricultural Institute.

An annotated list of his principal published works is incorporated in the article devoted to the 50th anniversary of Plotnikov's scientific activity, written by Academician B. N. Pavlovskii.

[There is a ~~Pavlovskiiixarticle~~ reference to Pavlovskii's article].

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

POSPELOV, VLADIMIR PETROVICH (1872-1949)

Doctor of Agricultural Sciences, Active member of the Academy of Sciences, Ukranian SSR.

One of the outstanding entomologists who played an important role in the development of native entomology.

Upon his graduation from the Moscow University in 1896, Pospelov accepted the position of assistant professor at the Chair of Zoology and Entomology at the Moscow Agricultural Institute, now the Agricultural Academy im. K. A. Timiriazev. In 1904 Pospelov became a lecturer at the Moscow University and senior specilialist for applied entomology of the Department of Agriculture. The same year Pospelov organized the first entomological experimental station in Kiev. In 1913 Pospelov became a professor of the Voronezh Agricultural Institute.

After the Great October Socialist Revolution Pospelov headed the Department of Applied Entomology at the State Institute of Experimental Agronomy. From then on he directed work on entomology in a number of pedagogical and scientific institutions.

Pospelov's pen produced 152 scientific works and works of popular science, including a number of important monographs and textbooks. His investigations of diapause in insects (dissertation for Master's degree) and his investigations in biology and of measures for the control of sugar beet pests (meadow butterfly [lugovoi motylek = Loxostege sticticalis], beet weevil etc.) are of special importance. In the last period of his activities Pospelov devoted most of his attention to the study of insect diseases and to the development of the microbiological method of pest control. He published on these subjects over 30 works in which he laid the theoretical foundation for the microbiomethod.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Pospelov was a brilliant popularizer of entomology. In his works, theoretical investigations are always closely connected with practice.

Years of Pospelov's fruitful pedagogical activities played an important role in the training of staffs for agricultural entomologists in the USSR.

[There is one reference cited].

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

RIMSKII-KORSAKOV, MIKHAIL NIKOLAEVICH (1878-1961)

Honorary President of the All-Union Entomological Society of the Academy of Sciences, USSR, member of Council of the Geographical Society, USSR; honorary scientific worker of the RSFSR, Professor, Doctor of the Biological Sciences. The son of the famous Russian composer, N. A. Rimskii-Korsakov. He received his secondary education in a classical gymnasium at Petersburg. In 1895 he graduated from the Department of the Natural Physico-Mathematical Faculty of the Petersburg University. In 1900 he was admitted as a university lecturer [for fees] to the same University, in 1917 he became an official university lecturer, and in 1919 he was appointed professor of the newly organized Chair of Entomology at the university. In 1921, after the death of Professor Kholodkovskii, he was elected Professor in-charge of the Chair of Zoology and Wood Entomology of the Institute of Forestry (now the Leningradskaia Lesotekhnicheskaia Akademiia im. S. M. Kirov.[Leningrad Technical Wood-Academy]) where he worked over 30 years until he died. He is known as one of the greatest authorities in the sphere of entomology. He did a great deal of teaching - apart from the institutions indicated above, he taught at the Women's Pedagogical Institute (1901-1903), at the Stebutov Women's Agricultural Courses (1905-1922) etc. He frequently went on scientific assignments within the borders of Russia and abroad (at the Strassburg and Munich universities where he worked in the laboratories of Prof. Gette [tr. note: probably Alexander Goette], Gartvig [probably Fritz Hartwieg] and others).

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

R.-K. was engaged in diverse scientific-organizational activities (director and scientific consultant of a number of industrial and scientific institutions and organizations) and also in scientific society work (editor of Proceedings of the Russian Entomological Society, member of the Council, Vice-President, and, in 1950, Honorary President of the All-Union Entomological Society, and Chairman of the Phenological Committee im. Kaigorodov at the Geographical Society, USSR). He was a delegate to many entomological meetings, conferences and congresses where he read reports (including the international zoological congress at Graz in 1910, and the Entomological Congress at Ithaca, USA, in 1928). He was distinguished by an unusually wide range of scientific activities with respect to questions under study and taxonomic groups of animals. In the last 30 years of his life he devoted special attention to problems of wood entomology, having surrounded himself with a whole group of entomologists who were dealing with problems of safeguarding trees against pests. The published works of R.-K. are extremely varied. One hundred and forty of his published works, including various reference books, handbooks etc. have been issued. In addition, R.-K. participated in the compilation of general keys to insects, in the compilation of in collaboration with V. I. Gusev) a key to tree and shrub plant injuries published in three editions, and a textbook on tree entomology (with a group of his fellow workers).

[There is a list of his principal published works and a reference to his in-memoriam].

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

SAKHAROV, NIKOLAI L'VOVICH (1879-1945).

Prominent worker who has done much for the developement of agricultural entomology. In his 25 years of instruction at the Saratov Agricultural Institute, Sakharov established a school of agronomist-entomologists who are working successfully in various localities. He headed the Department of Entomology of the Saratov Oblast Agricultural Experiment Station, and later the Institute of Agriculture of the South Eastern USSR. During this period he produced numerous scientific-research works which are of great scientific and practical importance. Of particular interest is Sakharov's work devoted to the study of the sunflower moth in connection with developing armored, moth-resistant [sunflower] varieties, to the clarification of the reasons for wheat resistance to the spring fly [iarovaia mukha = Phorbia genitalis Schnabl.], to the study of the winter moth in regard to which he was the first on to study in detail the problems of cold resistance in caterpillars, of pests of mustard and alfalfa, and to the study of fauna of noxious insects along the Volga River etc.

Sakharov published 145 printed works on problems of entomology. [There is a bibliography of his principal works and references].

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Translation A-766
(In full)
db/M

Petrov, T.K.

Novye lesa nashei rodiny.

[New forests of the USSR].

Priroda, no. 1, p. 35-43, 1953.
410 P933

(In Russian)

The Great October Socialistic Revolution has started an epoch of magnificent transformation of nature and of its subordination to the interests of the expanding Communist society. In our country afforestation occupies an important place in the transformation of nature which is being accomplished according to Stalin's plan. Care about the protection, correct exploitation and renewal of forests, also afforestation of huge regions are set up in our country to a height which is not possible to the capitalistic countries.

A 766

The great founder of the scientific socialism, K. Marx, in "Capital" wrote: "Development of civilization and of industry in general has manifested itself since long ago so energetically by destroying the forests, that compared to that which they did for the upkeep and planting of forests, it seems quite insignificant."(1) These words of K. Marx are confirmed by the whole modern practice of the capitalistic

(1) K. Marx. Capital, v. II, Gospolitizdat, 1951, p. 241

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

countries, where the plundering destruction of forests continues up to the present day. In the last 30 years the U.S.A. has lost 44% of its forests. England has cut down, during the First World War and during the period of the Second World War, 240 thousand hectares of forests, while new plantings were very scanty.

The helplessness of the capitalistic system in the accomplishment of a basic transformation of nature and the inability of bourgeois governments to conduct large public measures for planting of forests are especially clearly shown by the following facts. In the U.S.A. in 1935 a law was promulgated about planting 500 thousand hectares of shelter belts in the Great Plains. The small landowners, whose farms were situated on these plains were very much interested in carrying out this law. It is their fields that suffered from dust storms, as well as from drought. But the proprietary instincts appeared to be stronger than all the arguments of reason. The farmers did not want to give up parts of their possessions for plantings, which could not bring them immediate returns; cattle were grazed on the newly planted young trees. Even this plan, which was very small, compared to the scale of our afforestation works was completed only 12-14%, after which the planting of shelter belts on the Great Plains was stopped altogether.

England, in spite of the modesty of its plans for afforestation, also was unable to bring them to full accomplishment.

In our country /a country where (Begin p. 26) socialism got the upper hand/ the matter of forest plantings stands quite differently.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The USSR holds the foremost place in the world in its forest wealth. Our forests make up almost a third of all the forests on the earth. The planned planting of new forests proceeds from day to day, and our forest wealth grows in this manner. In the USSR during the prewar period, about the same number of forest trees were planted as during the preceding 100 years. Before the war we planted during a year more trees than all the countries of the world taken together.

New plantings were made along the rivers, as well as in old forest regions on places of old fellings, burns and thinnesses. But we see new forests also in places which were forestless until quite recently. Here, crosswise to prevailing winds, are planted shelter belts which play a role of moisture-accumulators in a dry steppe and become a barrier to drying winds and black storms.

In the first years of Soviet rule V.I. Lenin and I.V. Stalin planned ways for a transformation of nature that would do away with even a possibility of drought. Formation of steppe shelter belts expressed the strong will of the party and of the government to overcome the dependence of agriculture of the dry steppes on the whim of the weather.

Industrialization of our country and collectivization of our economy have created reliable grounds for wide spread anti-drought works. Their direction was discussed at the All-Union Conference in 1931 for control of drought, and a Government decree about the control of drought, which was issued in the same year, specified the planting of shelter belts on large areas, the planting of forests on inconvenient lands, and so on. In the last report to the XVII convention of VKP (b)

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

comrade Stalin said: "Planting of forests and of shelter belts in the eastern regions of the Volga's left bank has great value. This work is already under way, but oneccannot say that it is conducted with sufficient intensity." (1)

In the following period the forest plantings in steppes spread still wider, their quality improved, and now in the steppe regions of our country one already meets shelter belts, where trees already have interlocked their tops. These shelter belts have firmly established themselves in the surrounding nature, became its component part and have demonstrated their right for existence because they withstood many tests from severe droughts, frosts, dry winds, dust storms, and guaranteed an increase in the yield of the crops for the fields, which border them.

".....Here, besides rye," wrote at one time the hetman by delegation, Sviatopolk-Mirskii, to the czar, about the Sal'skii steppes in Rostovskaia oblast', "hardly anything can grow; even rye yields only 15-20 puds per 'desiatina' [2.70 acres]. Hot winds every year burn out all the sowings. A difficult and unfriendly country....." (2)

And now, in this "unfriendly" land is situated a kolkhoz in the name of I.V. Stalin, which is famous for its high yields; there is also the world-renowned, leading farm - the grain-sovkhoz "Gigant" [giant]. Here were propagated 600 hectares of shelter belts and under their cover annually, independently of the weather conditions, a large amount of grain is harvested. The average yield of winter (Begin p. 37) wheat

(1) I. Stalin. Problems of Leninism, 11th issue, Gospolitizdat, 1952, p.492
(2) Citation is from a book: L.B. Lunts, Green construction, Goslesbumizdat, 1952, p. 24

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

on fields, which are protected by shelter belts, is above 25 centners per h. The shelter belts and the high quality agrotechnics serve as a vigorous means to overcome the drought. This counts especially favorably during the years of sharp shortage of precipitations.

Thus, during an exceedingly dry year, 1946, the fields of the Scientific-Research Institute of Agriculture of the Central-Chernozem zone in the name of V.V. Dokuchaev, which were surrounded by the old "Dokuchaevski" and by new shelter belts gave 16.6 c of winter wheat, 15 c of winter rye, 15.8 c of oats, 21.2 c of sunflowers per hectare, that is three-four times more than did the neighboring fields, which were not protected by shelter belts.

Our socialistic reality has already given many confirmations to the vigorous influence of shelter belts on the increase of the yield of fields in steppe regions. On October 20, 1948, on the initiative of comrade Stalin a great plan of basic transformation of the nature of the steppe and of forest-steppe regions of the European part of the USSR was accepted. According to this plan, which was formed on a purely scientific basis, a full complex of agronomic and forestry measures was accomplished.

Planting of shelter belts in the steppe is one of these most important measures.

V.V. Dokuchaev, characterizing a damage done by destroying the steppe forests, wrote: "All this, even with a retention of the previous amount of atmospheric precipitations falling to the earth, must have inevitably entailed the following results: an increased evaporation of steppe waters, and, probably, increased the mightly cooling of the

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

steppe; decreased the amount of soil moisture and the lowering of the level of ground waters; an extreme increase in floods (spring and rain) in open steppe and in rivers, together with a shortening of their duration and decrease of the size of the summer supply of water as in rivers, so also in steppe water-divides; drying out and destruction of some sources and siltation of others." (1)

The Stalin plan for transformation of nature has foreseen afforestations of various types. First of all, these are the public protective shelter belts. Eight of such belts, of a total length above 5 thousand kilometers, will stretch out along water-divides and on both sides of rivers.

This will create conditions, which will eliminate siltation of the rivers and will be instrumental in the improvement of the water regime in the steppes. The chief value of these belts is to nullify the influence of the dry winds and prevent the blowing away and destruction of the fertile soil of lands along the Volga, of the North Caucasus and of the Central-Chernozem regions.

Besides this, the shelter belts are planted on the fields of kolkhozes and sovkhozes. These shelter belts will serve as the most important barriers to the dry winds, help to obtain high crops, improve the water supply, and impede the washing and blowing away of the soil in the steppe and forest-steppe regions.

In the Stalin plan for the transformation of nature much attention was also given to sands. Sands are a scourge of the national (Begin p. 38)

(1) V.V. Dokuchaev. Our steppes before and now, Sel'khozgiz, 1936, p. 102.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

economy. In the words of Academician V.A. Obruchev "The factories of dust" hurt our national economy in two ways: The territories which are covered by loose sands, that are not made fast by vegetation, cannot be used in most cases either for crops or for pasturing; also high winds pick up these sands and deposit them over the crops, cities, settlements and villages.

The basic sand masses are located in the central-Asiatic republics of our country, but in the European part of USSR they also occupy millions of hectares. The Astrakhanskii sands alone have spread over an area of about 2 million hectares. In the basin of the Don river and of its tributaries the sands occupy over one million hectares; over 800 thousand hectares are in the basins of Terek and Kuma and 180 thousand hectares - in the lower streams of the Dnepr.

Besides these, most of the well known locations of loose sands in the European part of the USSR are to be found in Voronezhskaia, Kurskaia, Tambovskaia, Kuibyshevskaia, Saratovskaia, Stalingradskaia, Chkalovskaia oblast' and in the Ukrainian SSR. "Here or there," wrote one of the Russian foresters of the last century, "are to be seen sand hills, and around them a sea of sand, under which are buried plowed lands and pastures; further on sand approaches farmsteads, covers up their vegetable gardens, courtyards; villages have this same pitiful, bleak look in these regions of sand. The population, which grew poor on account of these ill-fated sands, looked for a way out of this situation and migrated to far lands. They had no strength nor money to fight this enemy, neither had they any wise directions on the part...."(1)

(1) I.S. Matiuk. Sands and their economic mastering, Goslesbumizdat, 1949, p. 4

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Stalin's plan for transformation of nature foresaw, before 1955, the afforestation and securing in the steppe and forest-steppe regions of the European part of USSR of 322 thousand hectares of sand with a provision that by 1965 the whole territory of sands in this part of our country be afforested. Accoring to this same plan, up to 1955 all the gullies and ravines must be secured and afforested on an area of about 400 thousand hectares.

Besides these measures, which were specified in a decree by the Council of Ministers of USSR and by TsK of VKP (b) of October 20, 1948, deep leafy forests of economic value should be planted in steppes on areas of several hundred thousand hectares; cities, worker settlements must be surrounded by green rings - the reservoirs of fresh air. Here will be located suburban hospitals, houses of rest, pioneer's camps. Here, the forest-parks, the best places for walks and suburban rest, also should be laid out.

A considerable area will be occupied by plantings along canals and artificial water-reservoirs in the zone of great constructions of Communism. It is enough to say, that the planting with green plants of Kaspian low-lands and of the zone of the Main Turkmenskii canal will add to our forest plantings about 1350 thousand hectares.

Wayside forest plantings are also conducted everywhere, which later often become (Begin p. 39) wide shelter belts, stretching for tens of kilometers.

The Soviet Government has guaranteed a material-technical foundation for the accomplishment of the Stalin plan for the transformation of nature. It has created hundreds of forest-protective stations, which

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

are richly equipped with high technics: various types of tractors, new forest-planting and other machinery. A powerful scientific base was also created. This helps to correctly solve problems of shelter belt plantings in all the different locations of our native country. The northern limits of this forest propagation go as high as Tul'skaia and Riazanskaia oblast', and Mordovian ASSR.

Further on, the steppe forest-propagation passes over into the more southern oblast': Orlovskaia, Kurskaia, Tambovskaia, Voronezhskaia, spreads up to the Volga, crosses it and enters the left bank of the Volga, goes down to the south, encompasses the Northern Caucasus, the southern and eastern Ukraine, and the dry steppes of Northern Crimea. Laying out of shelter belts is also provided for steppe regions of Siberia, Central Asia and in other regions. The natural conditions in these localities are extremely variegated, where in the same place heat may reach up to 40°, and the frosts sometimes to 40°. Here are places with fertile chernozem, with slightly developed soils on sandy loams and on sands, with solonetz brown soils. Such a variety of soil - climatic conditions calls for the special attention of scientists and of operators when plans are plotted for forest-propagation in each oblast'. Yet the general requirement is to include in any plant group formed in the steppe such main tree varieties, as are distinguished by their longevity, tallness and general vigorous growth, and which, at the same time, have valuable wood.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Soviet science is very successfully coping with the achievement of this complicated problem. Large collectives of foresters, soil-scientists, agriculturists, hydrologists, and other specialists have made researches and continue to do research on the native conditions in the courses of governmental shelter belts, in the region of the great developments of communism, on sands, gullies, ravines, and so on. On the basis of these researches projects for afforestation of a given locality are then drawn.

Great constructions of communism are formed in dry steppes, in semi-deserts and in deserts with powerful irrigation systems. These systems will permit the irrigation of large areas which are occupied by shelter belts. Irrigation will be used in particular on governmental shelter belts in the basins of the Volga, Ural and Don, in plantings along the Volga-Donskoi maritime and irrigation canals, as well as on plantings along the banks of new artificial water-reservoirs.

Utilization of the newest scientific methods and perfect technique and the creative lift of the great mass of Soviet people guarantee a successful accomplishment of Stalin's plan for the transformation of nature. (Begin p. 40)

The history of the creation of the governmental shelter belt Kamyshin-Stalingrad is truly wonderful. This strip was supposed to be planted in the course of 15 years, ending towards 1965. However, the sowing and planting of forests on this strip are already finished. On the water divide of the rivers Volga and Ilovli three strips sprang up, each 60 meters wide with a distance between them of 300 meters.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

This truly unparalleled labor heroic deed was accomplished with the active help of members of Stalingrad's Young Communist League. It was the group of these young sons and daughters of the hero-town who were the pioneers of the early creation of the first green fortress on the great Russian river. Formation of the governmental forest strip Kamyshin - Stalingrad was conducted under the leadership of forest-protective stations of the Ministry of Forest Economy in USSR, which were organized on this course.

The sowings and plantings of forests on the governmental forest strip Belgorod-Don has been finished. It is winding in the form of two ribbons, each 30 m wide along the banks of the river Severnyi Donets. In the limits of the Voronezhskoi oblast' the big governmental strip Voronezh-Rostov has been finished.

Planting is being continued also on the remaining five governmental forest strips. One of the longest strips: mountain Vishnovaia-Chkalov-Ural'sk-Caspian sea proceeds along dry localities with Solonets soils. This strip is composed of three ribbons each 60 meters wide on the right bank of the river Ural and of three similar ribbons on the left shore. The total extension of the strip is over 1000 km.

In all, at the beginning of the summer of 1952 more than 60 thousand hectares were planted on the lines of governmental shelter belts. Thus, for three years the plan for the creation of governmental shelter belts was fulfilled almost to 60% (not counting the fall plantings of 1952).

Our scientists and practitioners achieved successes in the field of securing and afforestation of sands.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

An extremely interesting method was proposed by an active member of the Academy of Science of the Ukrainian SSR, P.S. Pogrebniak.

This method, which is being utilized on the Dnepr sands, will probably be used in other localities also. "A peat pillow" is created in the sand - a layer of soil for each young pine tree. This layer helps in the quick taking of roots by the young plants and increases their resistance to natural adversities.

In the regions of Central Asia the sands are being made secure by means of the sowing from airplanes of haloxylon, of "cherkez" [a plant belonging to the halophytes family], and of "kandym", as well as by other methods. In all, at the beginning of the summer of 1952 in the European part of USSR over 300 thousand hectares of sands were covered with plantings of young forests and sowings of grasses.

Plantings of field-protective shelter belts in kolkhozes and sovkhozes has assumed great importance. The number of individual kolkhozes, sovkhozes and of whole regions is multiplying that have fully accomplished the fifteen-year plan for plantings of field-protective shelter belts. Such are Kurganinskii raion of the Krashodarskii region, Novoanninskii raion of Stalingradskoi oblast', and others.

Great numbers of plantings are being conducted along gullies and ravines. In some places these plantings have already begun their protection from washouts and blowing away of the steppe soil. Thus, the three year shelter (Begin p. 41) belt along one of the sides of a large gully on the grounds of kolkhoz "Moskovskie Vyselki" in Krapivinskii raion of Tul'skoi oblast' is noticeably keeping in check the pressure of rain and of thawed waters running down the slope, preventing them from washing out

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

the soil. Members of the Kolkhoz have decided to plant trees all around the gully. These plantings will also help in the increase of honey yields, because there are a lot of linden and Siberian acacia - both excellent bearers of honey. There are many of such instances. In all, at the present time the plantings near gullies and near ravines occupy already over 350 thousand hectares. On this territory the activity of gully erosion and of soil erosion is being stopped, which previously took out of economic rotation many fertile lands.

The planting around canals and around artificial water-reservoirs in the region of the Volga-Don maritime canal in the name of V. I. Lenina is just beginning. Nevertheless, here too works have been conducted which are large in size, and are chiefly innovations in their methods. Millions of young plants and of seedlings were transplanted, as well as many grown trees.

Simultaneously with shelter belts, large massives of deep leafy forests of economic value are being planted. They already occupy an area of over 90 thousand hectares, not counting the plantings in the fall of 1952.

Large works are being unfolded in planting forests in semi-deserts and desert regions of Central Asia. Twelve governmental shelter belts are being formed in Azerbaidzhan, and 11 - in Georgia. Plantings of shelter belts are being conducted in Western and Eastern Siberia and in the southern Ural regions.

All these plantings in regions which were previously forestless will comprise in the nearest 10 years over 10 million hectares.

In places where black storms and dry winds have raged, where crops burned without rains, and where the spring floods and the summer downpours followed the course of deep water hollows into the gullies and ravines, washing out the most fertile layer of soil; there, where the wind used to

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

move from place to place great masses of sand, - in Ukrainian, Voronezh, Saratov, Kuban and other steppes - everywhere young forests are turning green. They are going to produce a powerful influence on every field: detain the snow and thus increase the stores of soil moisture; evaporate much moisture into the air and thus decrease its dryness; weaken the power of winds, and thus hamper both the blowing away of soil and the action of black storms. Shelter belts, introduction of grass crop rotations and other measures which are conducted according to the Stalin plan for the transformation of nature, will guarantee an unprecedented increase in the yielding capacity of fields, orchards; will give a lift to animal husbandry. This will annually give a colossal amount of additional grain and of products of animal husbandry, and will open new, great opportunities for the promotion of the well-being of the working people.

In grandiose reforming works, which have unfolded in our country the basic economical law of socialism which was discovered by I. V. Stalin finds its clear reflection - "to guarantee a maximum satisfaction of the ever growing material and cultural requirements [Begin p.42] of the entire society by means of uninterrupted growth and improvement of socialistic production on a basis of a higher technique." (1)

---

(1) I. Stalin. Economical problems of socialism in USSR, Gospolitizdat, 1952, p. 40.

Forest plantings are conducted not only in steppe, semi-desert and desert regions of our country. Yearly many plantings are done in old forest regions. All these forest plantings, taken all together for the last three and a half years constitute about four million hectares.

A new mammoth step in the protective forest planting will be achieved during the fifth Five-Year Plan for development in the USSR. The directives

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

of the XIXth meeting of the party foresees: "To guarantee further widening of the work on field-protective shelter belt plantings in steppe and forest-steppe regions, conducting of agroforestmeliorating measures for the control of soil erosion, as well as on afforestation of sands, formation of forests of economic value, and of green zones around cities and industrial centers, along the banks of rivers, canals and water-reservoirs.

Establishment during the five years of not less than 2.5 million hectares of shelter belts in kolkhozes and sovkhoses and about 2.6 million hectares of sowings and plantings of governmental forests".

In these figures is the beauty and vigor of the great creative work of our nation.

While the chiefs of the imperialistic countries are unfolding preparations for a new war and are fanning war hysteria, while they are bringing the race for rearmament to huge size, while American usurpers and their myrmidons create monstrous evil deeds in Korea, Malaya, Vietnam, and in other localities on earth, the Soviet Union is occupied with peaceful work of erecting great constructions of communism, planting forests, and are busy transforming nature for the good of men. To the forests, which were created by nature, Soviet people are yearly adding almost a million hectares of new forest plantings.

The composition of species of new plantings is exceptionally interesting from both a scientific and a practical point of view. When creating the shelter belts we remember that they must themselves firmly resist frosts, droughts and strong winds, while protecting the steppes from natural adversities.

In the resolution of the Council of Ministers of the USSR and TsK of VKP (b) "About the plan for field-protective shelter belts, introduction of grass crop rotations, constructions of ponds and of water reservoirs

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

to guarantee high and stable yields in the steppe and forest-steppe regions of the European part of USSR", the most suitable varieties of trees and bushes for the planted shelter belts are indicated. "One needs to pay special attention "-this decree points out -" to the propagation of oak trees as the most valuable and the most lasting variety in steppe regions".

It is exactly the oak that is the chief variety in government, kolkhoz and sovkhoz shelter belts on a large part of the territory of steppe and forest-steppe regions. In many of them also in the capacity of main varieties, are being and will be introduced pines, larches, birches, ashes, "melkolistnyi" [having minute leaves] elms. Thus, these basic Russian varieties determine the "face" of many steppe plantings.

In drier places, for instance, in Astrakhanskoi, Stalingradskoi Rostovskoi, [Begin p.45] Groznenskoi oblasts and in Stavropolski region on light-chestnut complex soils the main varieties are the "melkolistnyi" elms and the black locust.

In the Azov region and on Ciscaucasian chernozems of Krasnodarskii and of Stavropol'skii regions, and of Rostovskoi and Groznenskoi oblasts, together with oak, ash and acacia, the main varieties are also represented by honey locust.

The accompanying varieties are quite variegated. Among them we find various kinds of maple; of hornbeam, elm and others. Introduction into the number of accompanying varieties and bushes of fruit-berry and of nut crops presents an interesting peculiarity. In southern regions of the Ukraine, of Kuban, in Stavropol'e, Crimea and in Groznenskoi oblast' [illegible] there are many apricots in shelter belts, one also meets a plum (Prunus divaricata); such valuable crops as walnuts, black walnuts, and nut - funduk are now beginning to be introduced. In the land along the Volga,

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

and in the Central-Chernozem regions the border rows of shelter belts will abound in wild apples and pears, and in golden currants (Ribes aureum Pursch.). The white mulberry tree is very widespread in the most different places of the south and south-east.

Thus the steppe shelter belts will be not only green fortresses against drought, but also rich sources of the most diverse kinds of wood. This wood will be prepared during the time of forest fellings conducted during the caring for plantings. At the same time the shelter belts will furnish a fair amount of valuable fruits, berries and nuts which can be used fresh or in a reprocessed form; they also can serve as an important base for the development of bee-keeping.

During this process of realization of the Stalin plan for the transformation of nature, Soviet science is developing, its cadres are growing, the numbers of foresters are increasing. Merely in the last two years, 20 thousand specialists were prepared and are working on steppe forest plantings. For leskhozes (forest farms), collective and government farms over 300 thousand brigade-leaders, field team leaders and other specialists were prepared for forest plantings in the steppes, and for their care. The past year was marked by a further increase of these cadres. The constructive thought of the steppe foresters works indefatigably. Constructions of forest-planting machines are being improved; also of seeders, and cultivators; new machines have been created for cleaning seeds of forest trees and bushes. The rank and file of the tractor drivers and mechanics introduce many streamlining improvements into the factory constructions.

During the process of afforestation of steppes some mistakes were tolerated. Certain scientific methods were used without sufficient preliminary checking and without taking into consideration the local peculiarities; the rules of agrotechnics during planting of shelter belts

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

were not always observed.

An especially serious defect is poor care for the young shelter belts, which is noted on certain sections of shelter belts in Rostovskaia, Chkalovskaia, Stalingradskaia and other oblasts.

As a result of this deficiency the young trees in many places did not take root in sufficient numbers. At the same time the leading forest-protective stations, kolkhozes and sovkhozes show instances of creating excellent shelter belts.

Undoubtedly, the deficiencies will be corrected and the Stalin plan for the transformation of nature will be fully accomplished, and on a high quality level, long before the date as it was set by the decree of the Council of Ministers USSR and TsK of VKP (b) on October 20, 1948.

The renewed steppes will cater, the longer the better, to the needs of the forming communistic society; as time goes, the fuller the words of F. Engels become true: "People, who finally become master of their own social existence become also, in consequence of this, masters of nature".

Description of pictures:

on page 36: Nursery of Veliko-Anadol'skogo leskhoz. Ol'ginskii raion of Stalinskaia oblast' in Ukrainian SSR. Forest plantings along the banks of the water-reservoir.

on page 37: Field-protective shelter belts of the Scientific-Research Institute of Agriculture of the Central-Chernozem Zone in the name of V. V. Dokuchaev. Voronezhskaia oblast'.

top of page 38: Kolkhoz in the name of I. V. Stalin, Sal'skii raion of Rostovskaia oblast'. Shelter belt planted in 1938.

Bottom of page 38: Kolkhoz in the name of Sl M. Budennyi. Berezovskii raion, Odesskaia oblast'. Shelter belt planted in 1938.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

top of page 39: Kolkhoz in the name of S. M. Kirov. Stalingradskaia oblast'. Shelter belt planted in 1948.

Bottom of page 39: Governmental forest strip between Saratov and Astrakhan'. Enotaevskaia forest-protective station. Astrakhanskaia oblast'. Planted in 1949.

on page 40: Kolkhoz in the name of I. V. Stalin. Kotovskii raion in Odesskaia oblast'. Shelter belt planted in 1950.

Colored pictures facing page 40:

top one: Windbreaking shelter belt in the orchards of a sovkhoz "imeni M. V. Frunze". Tiraspol'skii raion in Moldavian SSR.

bottom one: Field-protective shelter belt in a kolkhoz "imeni S. M. Kirova". Achikulakskii raion in Groznenskaia oblast'.

on page 41: Nursery of Veliko-Anadolskii leskhoz. Ol'ginskii raion in Stalinskaia oblast' of Ukrainian SSR. Planted in 1952.

on page 42: An oak 30 years old, maples (Acer tataricum L.) and hawthorn are in the underbrush. Krasnodarskii region.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Zashchita Rastenii ot
Vreditelei i Boleznei
v. 1, no. 3, July-Aug. 1956.
(Not yet in DA)

(In Russian)

Table of Contents

Science in plant protection - for the implementation of tasks put down by the 20th Conference of the KPSS [Communist Party of the Soviet Union] ---------- 3

Economics and organization

Glushenkov, N. A. Appropriate organization of work on tractor-mounted duster-sprayers ---------- 5

Rumiantsev, P. D. Control of pests and diseases of stored stocks ---- 7

Shumaev, A. D. South-Kazakhstan anti-locust expedition ---------- 10

Umnov, M. P. Question as to form in which DDT is to be applied ------ 13

Mechanization

Korotkikh, G. I. Developing the aerosol method ---------- 16

Moisakhovich, Ia. A. Selection of sprayers for sugar beets ---------- 18

Methods and means

Zagovora, A. V. Safeguarding alfalfa seed plants ---------- 23

Ivanova, Z. V. Smoke canisters ---------- 26

Efremova, N. I., and Malinina, M. S. NIUIF-100 preparation for disinfection of warehouses ---------- 28

A 767

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Kasperovich, Z. S., and Shkurenko, G. M. Presseeding treatment of rye seed against stem [or flag] smut [Urocystis (Tuburcinia) occulta] ---------- 29

Agarkov, V. A. Virus diseases in wheat in the Vinitsa Oblast ---------- 31

Alekseev, P. M. Safeguarding vineyards ---------- 34

Solov'eva, E. P. Safeguarding kolkhoz orchards ---------- 35

Status [shtaty] of plant protection agronomists at MTS [Machine-tractor-stations] ---------- 35

Quarantine

Markin, A. K., and Obolenskii, V. N. Twenty five years of crop quarantine service ---------- 37

Abramenko, V. V. Problems of quarantine inspections at customhouses - 42

Sokolov, A. D. Our experience in external quarantine ---------- 44

V..... A..... Conference on Colorado beetle ---------- 49

Iakovlev, B. V. To strengthen measures against the Colorado beetle -- 50

Sinitsyna, N. V. How to detect diplodia on maize crops ---------- 52

Iashnova, N. V. Bacterial wilt in maize ---------- 53

Lesnikovskaia, A. Ia. News about control of the San Jose scale ------ 53

Foreign Experience

Filippov, N. A. Plant protection in the GDR [German Democratic Republic] ---------- 55

Scientific-Industrial Information

Shmigovskii, K. A. Lilac leaf miner [sirenevaia mol'-pestrianka]------ 58

Matveenko, T. M. News about the control of tobacco pests ---------- 58

Petrichenko, M. I. How I got rid of the mole potato pest [slepysh - Spalax microphtalmus] ---------- 60

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Calendar of pest and disease control

Advice to vegetable growers ---------- 61

Advice to fruit growers ---------- 61

International conference in Holland ---------- 63

Book shelf ---------- 64

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

A-768
(Am Mail)
VE/A

Kasperovich, Z. S., and Shkurenko, G. M.

Predposevnaia obrabotka semian rzhi protiv steblevoi golovni.

[Presseding treatment of rye seed against stem smut].

Zashchita Rastenii ot Vreditelei i Bolezneĭ, v. 1, no. 5, pp. 29-31. July-August 1956 (Not yet in DA)

(In Russian)

Stem [or flag] smut [Urocystis occulta] in rye is most widespread in the Leningrad Oblast and in a number of other oblasts in the non-black soil belt of the Soviet Unions. Some years it affects from 5 to 10% or more of rye crops.

In view of the external spore infection of seed material, it is recommended that presseding disinfection of seed for the control of stem smut of rye be carried out with various preparations.

At the Pushkin Base of VIZR [All-Union Institute of Plant Protection] tests of various methods of presseding treatment of the seed of grain crops against smut diseases have been conducted since 1951. Tests for winter rye have been carried out by artificial spore contamination of 2 varieties - RDS and Izumrudnaia [emerald] of newly harvested seed and of seed from carried-over stock [iz perekhodiashchego fonda].

Test results demonstrate that presseding treatment of winter rye seed with standard and with new preparations produces an entirely satisfactory anti-smut effect.

A 768

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

In a case of slight spore infection of seed (up to 1%), disinfection with the preparations indicated frees crops of stem smut infection completely. In cases of heavy spore infection, the remaining percentage of smut in young crop is 0--0.07. The best disinfectants are granosan and mercuran.

For 4 test years, the average increase in yield due to the application of these disinfectants to two varieties of rye was 4 centners per ha from granosan and 5.4 centners per ha from mercuran.

It must be noted, however, that the yield had even dropped by 0.2 c per ha when seed of the RDS variety, threshed while still damp, had been treated with granosan. The best disinfectant for newly harvested unheated seed of winter rye is the AB preparation, and the worst is formalin in a 1:300 solution.

Treatment of newly harvested seed of winter rye with a formalin solution caused a 1.8--2.2 c per ha drop in yield (of RDS variety), yet disinfection of seed from carried-over stock with the same preparation produced a yield increase of 0.7 c per ha (for the Izumrudnaia variety).

Dusting seed with the new combination preparation (AB/benzene hexachloride) also produced a satisfactory anti-smut effect and an average increase in yield by 4.4 centners per ha. (This preparation was made in the laboratory of VIZR of the mercuran type, compounded as follows: AB preparation 200 gr and technically pure benzene hexachloride 120 gr per centner of seed).

This combination preparation can be recommended as a disinfectant for winter rye seed against stem smut, and as a safeguard for sprouts against pest instead of the mercuric perparation mercuran.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

A comparative evaluation of new and standard disinfectants according to the influence they exert upon germination and the density of the plant stand has shown that the use of dry disinfectants has increased theen energy of seed germination by an average 3.6%, germination sprouting by 0.6% and density of the grass stand by 50 plants per square meter [kv m], yet the use of formalin, particularly for disinfection of newly harvested seed, decreased germination to a considerable degree and resulted in a thin stand of rye stalks.

An evaluation of winter rye infection by stem rust at the seeding of newly harvested seed and seed from carried-over stock is cited in the table.

Table.

Infection of rye by stem smut in relation to quality of seeding material

Seed	Germination energy in %	Sprouting in %	Density of plant stand per square m	% of stem smut in young crop	yield c/ha
Newly harvested	56.1	68.9	108	2.6	11.0
From carried-over stock	71.2	80.1	246	1.2	28.8

The table shows a clear preponderance of young crops from the seed of carried-over stock.

In conclusion it must be noted that diverse decreases in yield are observed when the degree of rye infection by stem smut varies. Thus, a 0.23--0.026% infection of the RDS variety of winter rye (1952) the decrease in yield was from 0.5 to 0.8 centners per ha, comprising 5--7.3% for the total yield. Upon a 0.61% infection of the plants of Izumrudnaia winter rye (1955) the decrease in yield reached 2.5 centner per ha. Hence, failure to observe control measures for stem smut in rye will result in losses of yield that will be significant on large areas.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Our observations show that stem smut in rye is distributed on the kolkhozes and sovkhozes in the Leningrad Oblast unevenly - on some farms it is found rarely, yet on others it reaches considerable dimensions. This situation is the result of incorrect practices applied to control measures against it. On farms where disinfection of winter rye seed material is practiced systematically, stem smut is absent, yet on those farms where anti-smut measures are either not practiced at all of practiced poorly - stem smut in rye spreads vigorously.

On the basis of the work conducted, the following resolutions can be drawn: 1.

1. Stem smut in rye causes big losses in yield, hence, preseeding disinfection of seed must be conducted even if infection of seed is slight.

2. The best disinfectants of winter rye seed against stem smut are the AB preparations, granosan and mercuran which, concomitantly with the disinfection of seed against smut, stimulate the growth and development of plants, and increase their yield.

3. Use of formalin in preseeding disinfection of winter rye seed can be recommended only for seed from carried-over stock, or for newly harvested seed which has been exposed to thermal heating, otherwise a thinning of the grass stand is observed.

4. The use of newly harvested rye seed for sowing purposes before they have undergone thermal heat causes serious thinning of the grass stand, a decrease in the effectiveness of disinfection, increased incidence of disease and a decrease in yield.

It is essential that kolkhozes do their utmost to ensure that winter rye be sown from seed of carried-over stock and from disinfected seed.

Pushkin Base of VIZR

* * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Agric. A--769
(In full)
vg/A

Science in plant protection - for the implementation of tasks put down by the 20th Conference of the KPSS.

Zashchita Rastenii ot Vreditelei i Boleznei, vol. 1, no. 5, pp. 3-4. July-Aug. 1956. (Not yet in DA)

(In Russian)

At the All-Union Conference of Workers of the Agricultural Science held in June 1956, in the Bol'shoi Kremlevskii Dvorets [Large Kremlin Palace] at Moscow, problems of agricultural science concerning the implementation of resolutions adopted by the 20th Congress of the KPSS [Communist Party of the Soviet Union] and directed toward a further rise in all branches of socialist agriculture were the subject of exhaustive discussion.

In the light of these problems, scientific-research work on plant protection which uncovers additional resources [reserv] for increasing the gross yield of agricultural production, is of more than minor importance.

In the prewar and postwar years, the scientific-research institutions for plant protection - VIZR, [All- Union Institute of Plant Protection], NIUIF [Scientific Institute of Fertilizers and Insectofungicides], institutes of the Academy of Sciences USSR, branch, zonal and others institutes - accomplished considerable work in the search for means and methods for the control of crop pests and diseases and the eradication of weeds. Their application to production allows prevention of mass injury to yields caused by pests.

A 769

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Yet, as the conference has noted, the science of plant protection, regardless of its achievements, owes agriculture a great deal, and the level of current investigations does not by far answer the growing demands of socialist agriculture.

Current control measures used against the principle pests and diseases of agricultural plants, such as the Eurygaster bug, beet weevil, spider mite, meal moth, San Jose scale, the lesser apple worm, potato canker, rust etc., call for large expenditures of funds and labor, yet due to their lacking effectiveness they fail to provide complete protection of the yield.

Up to now, investigations of scientific institutions were directed mainly toward the development of control methods only for individual plant pests and diseases; development of systems of measures for the elimination of mass outbreaks of some pests and for the protection of certain crops (sugar beets, cotton, flax, maize etc) against injuries by pests and diseases under conditions of the different zones of the USSR, received no consideration whatever.

The work of synthesizing more effective poison chemicals and their adaptation to production is extremely slow.

Designing of new, more economical and highly efficient machines is organized on a completely unsatisfactory scale.

Scientific-research work is conducted in many cases on a low theoretical level. Experience of foreign countries is studied and utilized carelessly. Advanced methods of pest and disease control are publicized, propagandized and adopted very slowly.

The situation of developing and adapting to production the chemical method of weed control is very bad. It is given no due consideration

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

either by scientific-research organizations, or by the Ministry of Agriculture, USSR.

One of the serious shortcomings in scientific-research work concerning plant protection is the underestimation of the economic aspect of the measures proposed; this frequently leads to recommendations of expensive, ineffective and inadequately tested measures for adaptation to production.

Scientific-research organizations are still extremely slow in working out these urgent agricultural problems.

A glaring illustration of this is the development of a centralized method for cotton seed disinfection. The sulfuric-acid method proposed by science in 1938 was not adapted to production. Nonetheless, many scientific-research organizations have continued to deal separately with this important problem for twenty years, large sums have been expended, but there still is no approved method for centralized disinfection of cotton seed. This intolerable situation developed primarily as a result of poor coordination of scientific-research work for the protection of plants, and because many scientific workers have of teh disregarded critical comments made by production workers. Only after twenty years did the authors of this method acknowledge its unfitness, and now they are proposing another - the sulfuric-acid-mechanical method - [Begin p.4] the desirability of which for adaptation is also very doubtful.

The situation in the development of measures for dodder control is no better. Many scientific organizations are dealing with this question, yet up to now production has no effective method.

In a number of cases, scientific-research organizations have recommended a measure, which they have developed, for distribution over the

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

entire territory of the USSR, without taking into account the differences of natural and climatic conditions.

Thus, for instance, VIZR recommended wide-spread use of DDT dust for control of the Eurygaster bug. Experience, however, has shown that it cannot be applied everywhere with adequate effectiveness; VIZR, however, for a long time disregarded the critical comments made by production workers and thereby delayed for several years the development of the more effective preparation of "vofatox" [vofatoks] and its adaptation to production.

Almost all scientific-research organizations dealing with questions of plant protection have in recent years turned to testing new preparations, while many urgent problems are left uninvestigated. New preparations, naturally, have to be tested, but this work is fully provided by 25 organizations which are responsible for it by order of the MSKH [Ministry of Agriculture], USSR.

This unsatisfactory planning of research is the fault of the Section of Plant Protection of VASKHNIL [All-Union Academy of Agricultural Sciences im. Lenin]. It was incapable of organizing properly the work of the annual conferences on planning and methods called to coordinate the subject matter [tematika] of scientific-research organizations.

The Section of Plant Protection of the All-Union Conference held by Workers of the Agricultural Science had a critical discussion of the project for problem and subject planning for the sixth five-year-plan, worked out by the All-Union Institute of Plant Protection and the Main State Inspection for Quarantine and Plant Protection of the MSKH, USSR, and made in it substantial corrections.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The plan provides for radical improvement in the development and adaptation to production of zonal systems of measures for control of pests and diseases of agricultural crops, for a search of highly effective chemical means of weed control and for the control of the principle pests and diseases, for the development of biological, agrotechnical and biophysical methods for the protection of plants and stored agricultural products, for the study of methods of localizing and eliminating the nidi of quarantine pests and diseases, for a study of the nature of plant resistance to causal agents of disease and injurious insects, and of economic questions pertaining to plant protection.

On the basis of a thorough study of the biology of injurious insects and diseases of plants, provisions have been made for the development of methods for long-range and short-range prognoses of the reproduction and distribution of pests and of the development of diseases.

In the sphere of mechanization the following is noted: improvement of existing and development of more efficient and effective types of sprayers, dusters, aerosol generators, injectors, machines for the preparation, scattering, placement and covering-up of poison bait, machines for disinfection of seed, application of concentrated solutions, emulsions and suspensions, for the control of weeds, introduction of powder-like poisons into the soil, uncovered [bespalatochnaia] fumigation of citrus and tea plantations, surface and depth disinfection of the soil, as well as improvement of existing and development of new types of airplanes, gyroplanes and aviation equipment, and mechanisms for loading poison chemicals onto airplanes.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Chairs [Faculties] of Plant Protection in advanced agricultural schools and universities are to render important assistance in the accomplishment of scientific work.

As a result of new problems, the scientific work of the All-Union Institute of Plant Protection will have to be realized in a future plan. To begin with, this Institute should be directing coordination, the proper trend of investigations and methodical supervision of all scientific activities of agricultural scientific institutions conducting investigations in quarantine and plant protection. Concomitantly with the above, the Institute should be dealing with the development of theoretical questions and individual problems of Union-wide importance.

There is no doubt that plant protection workers of scientific-research and educational institutions are mobilizing all of their strength and knowledge for the implementation of the great tasks arising from the resolutions passed by the 20th conference of our beloved Communist Party.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

A-770
(In full)
vg/A

Umnov, M. P.

K voprosu o formakh primeneniia DDT.

[Question as to form in which DDT is to be applied].

Zashchita Rastenii ot Vreditelei i Boleznei, vol. 1, no. 5, pp. 13-15 July-Aug. 1956. (Not yet in DA)

(In Russian)

One of the principal insecticides used to protect plants against pests is DDT applied in the form of dusts, suspensions, emulsions and aerosols. Yet, at the same time, there is no unanimous opinion in literature as to how long this preparation retains its toxic properties.

Pokrovskii, experimenting with rice and granary weevils, established that DDT spread on glass in a thin layer rapidly loses its toxicity under the influence of solar radiation. The first to lose their toxicity are emulsions, then suspensions, and those losing it the least are dusts. However, the phenomenon observed on green leaves was reversed: DDT dust lost its toxicity completely after a 25-hour exposure to the sun, while emulsions under similar conditions lost 60% after 10 days, and 70% after 12 days.

Veintraub and Fukel'man also pointed out the rapid decomposition of DDT under the influence of solar rays, although this process proceeds slowly on green leaves.

A 770

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Vasil'ev and Serebriannaia who determined the amounts of DDT which remain on fruit arrived at the conclusion that DDT in the form of dusts, suspensions and emulsions is retained up to 65 days. Besides, when the chemical was applied in the form of dusts, it remained only on the surface in the amount of 0.5--0.75 mg per kg of fruit, yet upon treatment with emulsions the preparation was found under the fruit peel at the rate of 2.5--8 mg per kg.

Bogdarina who conducted similar investigations found 0.9 mg of DDT per kg of fruit 53 days after the last - the fourth - treatment with dust, and 4.85 mg of DDT per kg of fruit after spraying with emulsions.

Authors who have studied this problem with the lesser apple worm as object, have obtained similar results regarding the duration of DDT action upon the pest indicated.

Popova estimates that this time period is 15--16 days, Parfenov - 20 days, Pashchenko - 20--30 days.

In our experiments with caterpillars of the American butterfly it was established that the duration of DDT action, when applied in the form of aerosols, is 100 days, when sprayed as emulsions 45--80 days, as suspensions - 22-28 days, and when used as a dust - 15 days.

The above data indicate that the duration of DDT action has a direct relation to the capacity of the solvent or the filler (oil, water, talcum) tp penetrate into the tissues of leaves. The greater this capacity, the longer the action of the preparation.

This conclusion justified the assumption that the amounts of DDT lethal for the pest are not preserved on the surface of a leaf, but within it. To verify this hypothesis the following experiments were

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

conducted.

Caterpillars of the American butterfly were put for 30 minutes on leaves of different plants treated with a 1% DDT emulsion on one side only. The caterpillars did not feed during this period. Then the caterpillars were transferred to untreated leaves and the result of DDT contact action was counted 24 hours and 48 hours later.

In parallel experiments conducted on leaves of the same plants, treated the same as in the preceeding experiment - on one side only - the caterpillars were given an opportunity to feed themselves. The experimental result are cited in the table.

Table.

Duration of DDT action in relation to form and method of its application

Time when caterpillars were placed on leaves after latter had been treated with DDT emulsion	Mortality of caterpillars in %					
	on treated side of leaves		On untreated side of leaves		Control	
	upon contact	upon feeding	Upon contact	Upon feeding	1	2
On 2nd day	26.8	100	5.9	100	1.6	0.6
On 35th day	13.0	100	0.0	98.0	0.0	0.7
On 43rd day	6.0	-	0.0	-	0.6	-
On 80th day	-	100	-	97.0	-	1.1

[Begin p.14]. Thus it is obvious that DDT rapidly loses its toxicity on the surface of the leaves and by the second day after the treatment practically fails to protect the plant against the pest.

At the same time the insecticide, having penetrated the tissues of leaves, retains its toxicity very long, and in our experiments it immunized" plants up to 80 days.

Kozlova and Dvortseva, and Mardzhanian indicate that DDT possesses

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

the properties of a systemic poison. Plants grown from seed dusted with DDT, or grown in soil into which this preparation had been introduced proved toxic for aphids, Locustidae, Eurygaster integriceps, caterpillars of the cotton bollworm, the cabbage butterfly, horse-radish leaf beetles [Phaedon cochleariae], Phytonomus and others.

In this connection, it was interesting to ascertain whether DDT has a systemic effect after it has been applied to plant leaves.

For this purpose the leaves of a mulberry tree were treated with a DDT emulsion only at the upper part or at the base, and after 3--5 days the caterpillars were fed separately the treated part of the leaf and the untreated part. In the first case the destruction of caterpillars was 100%, in the second - 38--52%, and in control 1.2%. These data testify that the DDT emulsion penetrates into the leaf and spreads in its parenchyma.

The penetration of a DDT emulsion into leaves occurs very rapidly. When plants were rinsed with water and even with a 1% soap solution immediately after the treatment, the DDT emulsion remained in the leaves. When the latter were fed to caterpillars they perished almost completely. Consequently, the capacity of emulsions to penetrate into leaves rapidly eliminates the need to repeat the treatment of plants even after a heavy rain. In our experiments systemic action of DDT emulsions was not established, since DDT does not transfer from one leaf into the other. Feeding leaves which had grown after the plant had been treated with an emulsion did not cause destruction of caterpillars.

In connection with this, the duration of a practically effective action of DDT will depend also on the degree of foliation on the plants at the time spraying is conducted.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

When an apple tree and a mulberry tree were treated with a 1% DDT emulsion at an early date (25th of May), the mortality of caterpillars placed on the leaves of the apple tree was 100% on the 37th day after the treatment, and 85% on the 70th day, while the percentage on the mulberry tree was 17 and 13% respectively. This sharp difference can be explained by the fact that on the apple tree 73% of all leaves were developed on the day it was treated, but on the mulberry tree only 20%.

When the same crops were sprayed at a later date, i.e. when the degree of foliation on the apple tree and mulberry tree had reached 80 percent, the emulsion retained its toxicity on both crops almost the same length of time (on the apple tree - 55 days, on the mulberry tree - 48 days).

The ability of DDT emulsions to penetrate and to remain a long time in the tissues of plants explains also its greater effectiveness as compared with dusts and suspensions of the same preparation.

Pokrovskii cited a long list of pests against which DDT used in the form emulsions was highly effective, yet applied in the form of a dust or suspension, it had proved little effective.

Diagram - Economic Indicators of the

Cost of Spraying

[A chart showing the cost of labor, poisons, dusting and spraying of field crops and orchards in rubles and kopeks]

[Begin p. 15]. The works of Mirzoian with the oak-mining weevil, those of Berdnikova - with the lilac moths, poplar moths, and the oak-mining sawfly, and the works of Lozovoi - with the maple sawfly and the oak that

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

moth have established that the larvae of the pests referred to, located in the mines, perished after it had been sprayed with DDT emulsions and suspensions, while dusts exerted upon them no influence whatever.

There is reason to believe that DDT emulsions and suspensions will be more effective than dusts against other mining pests as well, particularly, against the tea, olive and mallow moths.

The duration of DDT emulsion action permits a reduction in the number of treatments; it can be assumed that one spraying with an emulsion will take the place of two or three dustings.

Thus, the doubtless advantage of using DDT in the form of emulsions, emulsive suspensions [emul'go-suspensii] and suspensions, rather than in the form of dusts, becomes quite clear.

Nonetheless, those who practice plant protection use DDT in its least effective form - as a dust. In 1954, for instance, when industry released DDT to agriculture, 89.3% of the total amount of the preparation was in the form of dusts and only 10.7% in the form of emulsions; in 1955, 88.4% and 11.6% respectively, and plans made for 1956 specify 85.2 in the form of dusts and 14.8% in the form of emulsions.

A preponderant amount of DDT dusts is consumed in treating agricultural crops by the method of dusting and only an extremely small portion is applied in the form of suspensions. The preponderant use of DDT in the form of dusts is frequently justified by implying that the dusting method is more efficient and hence economically more advantageous.

A simple calculation, however, shows the incompetence of this opinion. For example, aircraft treatment of wheat against the Eurygaster bug, or of beets against weevils consumes DDT at the rate of 30-40 kg per ha and costs 26-35 rubles. According to GVF [Civil Air Fleet] tariff tables, dusting of 1 hectare costs from 9 rubles 50 kopeks to 11 rubles 50

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

kopeks. Thus, the average total cost per ha is 40 rubles. Treatment of the same crops with a DDT emulsion at the rate of 100 liters of a 1.6% solution per ha will cost a total of 16 rubles 40 kopeks (3 rubles 40 kopeks - the price of poison, and 13 rub. the cost of labor for spraying).

A similar situation exists in the treatment of orchards. The total cost of aircraft spraying of a 1% DDT emulsion in two turns is 25 rubles and 40 kopeks (4 rub. 60 kop. - the price of poison and 20 rub. 80 kop. for labor), yet dusting at the rate of 40 kg of dust per ha incurs an expenditure of 46 rub. 90 kop. (34 rub. 40 kop. for poison and 11 rub. 50. for labor).

Similar calculations for a number of other crops treated by the aviation as well as by the surface methods show that the cost of spraying exceeds the cost of dusting only in individual cases.

Considering the greater effectiveness, half the number of treatments and, in many cases, the possibility of combining spraying against pest with the simultaneous control of weeds and plant diseases, spraying of crops with a suspension or emulsion should be practiced whenever possible, and the use of dusts should be rejected.

It is recommended that DDT emulsions be applied to fruit plantings and to some vegetable crops not later than 45 days preceeding the harvest, for the amount of DDT that remains in the products after an emulsion treatment is usually larger than that after dust. Nonetheless, even in this period, spraying with suspension is certainly better than applying dusts.

A great advantage of DDT suspensions and emulsions is also the fact that they can be applied in combination with acaricides and systemic poisons (esters of sulfonate (efirsul'fonat), octamethylene, mercaptophos),

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

which is absolutely necessary in the treatment of orchards, cotton and other crops infested by mites. Should these crops be treated with DDT dusts then it would be necessary to add to them sulfur in which they are deficient, or to carry out supplementary treatment with acaricides.

There can be only one conclusion with regard to everything stated above - production of the various forms of DDT preparations must be radically changed. Principally, DDT must be released in the form of emulsion pastes, in powders with a large content of DDT (for suspensions), emulsions, and only a small portion in the form of dusts for dusting.

* * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Praksin, S. S., and Kondratenko, F. T.

Ozimaia rozh v tsentral'noi polose.

[Winter rye in the central belt].

Moskva, Gosudarstvennoe Izdatel'stvo
Sel'skokhoziaistvennoi Literatury,
1955, 119p. 69.25 P88

(In Russian)

INTRODUCTION

Table 1.

Data on productivity of winter rye for 1948-1952, on State variety test plots, compared with other food crops

Test plots	Regions and Autonomous SSR	Average yield for 5 years (in c per ha)		
		Winter rye	Winter wheat	Spring wheat
Dmitrov	Moscow	34.6	35.1	24.3
Nekouzsk	Iaroslav	28.2	26.9	8.6
Krasnoslobodsk	Mordovian ASSR	22.3	16.7	12.2
Vladimir	Vladimir [Region]	29.5	22.3	12.7
Bogoroditsk	Tula	19.2	16.9	12.0
Gorodetsk	Gorki	36.6	26.9	19.0
Ilin	Ivanov	31.8	31.0	17.6
Starozhilov	Riazan	24.2	20.0	-
Maloiaroslavets	Kaluga	36.7	39.6	17.0
Manturov	Kostroma	31.7	20.9	11.8
Likhoslavl'	Kalinin	33.1	26.1	-
Gzhatsk	Smolensk	22.9	22.3	16.1

A 771

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Productivity of winter rye on kolkhozes "Pobeda", Dmitrov District (heavy clay soils), and "Borets", Bronnits District (light clay soils), Moscow Region

Year	"Pobeda" kolkhoz		"Borets" kolkhoz	
	Cropping area (in ha)	Yield (in c per ha)	Cropping area (in ha)	Yield (in c per ha)
1938	20.0	22.4	48.4	14.3
1939	25.0	27.0	47.6	7.7
1940	18.7	20.4	48.4	21.3
1941	23.0	29.5	52.9	13.3
1942	18.0	22.6	48.0	15.0
1943	28.1	21.3	66.0	23.0
1944	31.2	27.4	61.1	22.6
1945	30.5	24.0	60.6	17.3
1946	18.2	30.3	48.9	19.0
1947	29.0	33.1	72.0	30.0

CHAPTER II. BEST RYE VARIETIES FOR REGIONS OF CENTRAL BELT

Table 3.

Varietal composition of winter rye in central regions of non-black soil belt in 1951

Regions and Autonomous SSR	In % of total rye crop in region						
	Variety						
	Viatka	Viatka Moskovskaia	Lisitsyna	Avangard	Kazanskaia	Novozybkovskaia	Others
Vladimir	98.2	-	-	-	1.8	-	-
Gorki	53.1	-	0.18	21.9	42.02	-	2.8
Ivanov	100	-	-	-	-	-	-
Kaluga	93	5.63	0.13	-	0.04	1.2	-
Kostroma	90.5	-	-	-	-	-	9.5
Mordovian ASSR	-	-	93.5	0.64	4.0	-	1.86
Moscow	17.08	77.1	2.1	-	-	-	3.72
Riazan	21.5	-	72.3	-	-	-	6.2
Tula	32.0	0.01	67.8	-	-	-	0.19
Iaroslav	99.8	-	-	-	-	-	0.2

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

CHAPTER IV. CLIMATE OF THE CENTRAL BELT

Table 4.

Average monthly and yearly air temperatures as per data gathered for several years (in °)

City	Months												Per year
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Moscow	-10.3	-9.6	-4.9	3.7	11.7	15.5	17.8	15.7	10.3	3.9	-2.4	-8.0	3.6
Razian	-10.6	-9.9	-5.9	4.4	13.3	17.2	19.4	17.5	11.5	4.7	-2.1	-8.0	4.4
Kaluga	- 9.4	-8.8	-4.0	4.4	12.5	16.2	18.0	16.2	11.0	4.8	-1.8	-7.9	4.3
Tula	-9.9	-9.4	-4.6	4.5	12.9	16.7	18.7	16.7	11.1	4.8	-1.6	-7.2	4.4
Ivanovo	-11.5	-10.5	-5.2	3.5	12.0	16.4	18.7	16.3	10.0	3.5	-2.9	-9.2	3.4
Poshekhon'e-Volodarsk	-11.5	-10.7	-6.9	3.0	10.4	16.1	17.4	16.2	9.4	2.7	-3.4	-9.3	2.7
Gorki	-11.8	-10.7	-5.3	3.7	12.8	16.4	18.9	16.8	10.6	3.4	-3.3	-9.8	3.6

Table 5.

Average monthly and yearly precipitation (in mm)

City	Months												Per year
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Moscow	22	21	26	35	46	68	80	74	56	60	37	30	545
Riazan	35	28	27	26	38	55	58	56	34	42	34	41	462
Kaluga	33	28	25	35	48	78	94	82	61	66	45	39	614
Tula	28	24	25	32	46	64	78	57	47	46	34	31	512
Ivanovo	34	32	31	37	50	62	71	73	66	58	50	40	604
Poshekhon'e-Volodarsk	32	24	27	29	48	76	65	76	66	54	38	36	571
Gorki	31	28	27	30	39	60	73	76	62	44	27	26	479

Table 6.

Temperatures in different soil horizons in relation to snow cover

Object observed	Depth of soil layer (in cm)		
	0	20	40
Soil without snow cover	-16.6°	-14.1°	-10.6°
" under snow cover	- 1.9°	0.2°	0.8°

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

CHAPTER V. PLACE OF WINTER RYE IN CROP ROTATIONS

Table 7.

Yield of winter rye in experimental years on diverse fallow (in c per ha)

Type of fallow	Years			Average of 3 years
	1923	1924	1925	
Late	5.7	8.1	4.9	6.2
Early	8.2	13.6	6.7	9.4
Potato	6.8	8.6	-	7.7

Table 8.

Yield of winter rye after diverse crops had occupyed fallow (in c per ha)

Crops occupying fallow	Years				Average for 4 years
	1926	1927	1928	1929	
Flax	21.7	19.2	16.2	18.0	18.7
Vetch-oats for hay	19.4	18.7	17.4	19.5	18.7
Vetch-rye	18.6	20.9	16.6	23.9	20.0
Potatoes	18.5	16.4	16.3	23.6	18.6
Fallow, early	25.8	26.4	22.6	26.6	25.2

Table 9.

Data on productivity of winter rye after various types of fallow (in c per ha)

Experimental Station	For period of	Type of fallow	
		Clean	Vetch-oats
Moscow, Moscow Region	8 years	21.2	18.1
Timiriazev Agricultural Academy, Moscow	15 "	23.0	20.4
Tula Experimental Field, Tula Region	6 "	21.6	16.9
Western [Zapadnaia], Smolensk Region	4 "	18.6	15.5
Pless Experimental Field, Ivanov Region	6 "	20.6	13.2
Shuisk Experimental Field, Ivanov Region	6 "	18.0	15.7
Vladimir Experimental Field, Vladimir Region	2 "	21.1	17.4
"Krasnyi maiak", Moscow Region	1. "	24.7	22.1

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 10.

Productivity of winter rye after vetch-oats fallow on various test plots (in c per ha)

Test plot	Region	Maximum and minimum yield by year									
		1946		1947		1948		1949		1950	
		Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Maximum
Dmitrov	Moscow	32.3	31.7	46.3	45.8	31.6	28.1	28.1	24.4	36.2	32.3
Galicia	Kostroma	-	-	-	-	-	-	37.7	37.3	43.3	40.5
Kaluga	Kaluga	19.1	19.1	26.4	25.4	27.2	27.2	25.6	25.4	32.7	27.9

Table 11.

Productivity of winter rye after potato fallow (in c per ha)

Experimental Institution	Region	Length of observations	Type of fallow	
			Clean	Potato
Moscow Regional Experimental Station	Moscow	8 years	21.2	17.4
Timiriazev Experimental field	"	15 "	23.0	21.8
Tula " "	Tula	6 "	21.6	17.6
Pless " "	Ivanov	6 "	20.6	16.9
Vladimir " "	Vladimir	2 "	21.1	20.7
"Krasnyi maiak"	Moscow	2 "	24.7	23.4

Table 12.

Productivity of winter rye after clover fallow

Experimental Institution	Number of years observed	Yield of winter rye	
		After clover 1 year in use	After vetch-oats fallow
Moscow Experimental Station	8 years	20.3	18.1
Vladimir Experimental Field	2 "	16.1	14.3
Simbileev Experimental Station	3 "	11.9	11.1
Vorotynsk Experimental Station	1 year	19.0	19.5
Western Experimental Station	3 years	19.2	18.2

Table 13.

Productivity of different winter rye varieties after clover fallow in 1947, on test plots of the Tula Region (in c per ha)

Variety	Test plot	
	Aleksin (gray forest-steppe soil)	Epifan (degraded chernozem)
Viatka	18.9	25.7
Viatka moskovskaia	20.2	25.0
Lisitsyna	20.8	26.1
Novozybkovskaia	19.2	-
Voronezhskaia SKHI	27.9	25.8
Tul'skaia No. 1	21.8	25.3
Mestnaia	-	25.9

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 14.

Productivity of different winter rye varieties after clover fallow on test plots of the Riazan Region in 1947 (in c per ha)

Variety	Test plot	
	Pitelin (light-gray forest-steppe soils)	Lebedian (degraded chernozem)
Viatka	17.3	25.5
Viatka moskovskaia	16.0	27.8
Lisitsyna	16.5	29.7
Voronezhskaia SKHI	16.4	30.8
Mestnaia	15.3	-

Table 15.

Productivity of different winter rye varieties after clover fallow on test plots of the Briansk Region for 1947 and on average for 6 years (in c per ha)

Variety	Test plot					
	Vygonich (gray forest-steppe soils)		Starodubov badly degraded chernozems		Komarichesk (light-gray forest-steppe soils)	
	1947	6 years	1947	6 years	1947	6 years
Petkusskaia	32.4	21.1	23.4	22.8	-	-
Novozybkovskaia	32.1	30.4	20.7	26.3	30.8	29.8
Lisitsyna	31.8	24.7	21.8	26.9	30.8	24.7
Steklovidnaia	29.9	29.1	21.3	31.0	31.5	31.3
Voronezhskaia SKHI	28.9	18.1	21.0	19.5	30.2	20.4
Viatka	27.8	19.9	20.5	24.5	28.9	22.6
Mip	27.3	18.9	21.3	19.5	31.5	22.9

Table 16.

Growth dynamics of grain crop yield on kolkhozes before and after adoption of crop rotations

Kolkhoz	Productivity of grain crops by years (in c per ha)		
	1939	1947	1948
"Kliushnikovo"	17.34	26.71	28.42
"Kulikovo"	19.14	21.26	22.12

Table 17.

Productivity of winter rye on kolkhoz "Krasnyi priboi", Kostroma Region

Year	Cropping area (in ha)	Yield (in c per ha)
1944	98.24	9.64
1945	101.5	10.95
1946	102.0	13.88
1947	111.5	18.31

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 18.

Productivity of winter rye on kolkhoz imeni Sovetskaia Armiia, Yaroslav Region

Year	Area (in ha)	Yield (in c per ha)
1947	18.0	26.0
1948	18.0	26.6
1949	17.0	30.2
1950	17.5	25.0
1951	26.6	28.0

CHAPTER VI. TILLAGE PRACTICES

Table 19.

Moisture reserves in soil (in mm) in summer of 1951

Seedbed (pakhortnyi sloi)	Date when determined				
	May 22	July 3	July 12	July 26	Aug. 14
Not deepened	174	87	60	108	157
Made deeper in 1949	201	104	73	111	163

CHAPTER VII. SYSTEM OF FERTILIZING WINTER RYE

Table 20.

Consumption of nitrogen, phosphorus and potassium by winter rye (in kg per ha)

Month	Nutritive substance		
	Nitrogen	Potassium	Phosphorus
October } November }	10	11	3
April	15	22	7
May	17	27	11
June	17	7	6
July	2	-	2
Total	61	67	29

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 21.

Content of nutritive substances in manure in relation to fodder quality

Name of farm	Basic types of fodder	Content in fresh manure (in %)		
		Nitrogen	Phosphorus	Potassium
"Kuz'minki" kolkhoz, Mikhnev District	Straw from oats and a cutting of rye [straw] with small amount of flour	0.32	0.18	0.30
"Kliushnikovo" kolkhoz, Communist district	Good flood-plain hay	0.48	0.29	0.62
"Lesnye poliany" sovkhoz	Good clover and meadow hay, root crops and concentrates	0.72	0.41	0.78

Table 22.

Number of field	Crop sequences	Fertilizer per ha
1	Perennial grasses first year in use	--
2	Perennial grasses 2nd year in use	During plowing of perennial grasses 2 centners of superphosphate and 1.5 centner of potassium chloride
3	Spring grain crops	--
4	" " "	2 centners of superphosphate
5	Fallow	6 centners of phosphorite meal
6	Winter rye	Spring supplementary feeding (1 centner of ammonium nitrate and 2 c of superphosphate)
7	Root and leaf crops	1 centner of ammonium nitrate
8	Spring grain crops	--
9	Fallow	30 tons of manure, 6 centners of phosphorite meal
10	Winter wheat with supplementary seeding of grasses	Spring supplementary feeding (1 centner of ammonium nitrate and 2 centners of superphosphate)

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 23.

Number of field	Crop sequences	Type of fertilizer	Fertilizers per
1	Clover, 1st year	Superphosphate	1 cent.
		Potassium salt	1 cent.
2	Clover, 2nd year	Fine manure during plowing	15 tons
3	Winter rye	In supplementary feeding:	
		nitrogenous fertilizers	0.7 cent.
		superphosphate	1.0 "
		potassium salt	1.0 "
4	Oats	In supplementary feeding,	
		nitrogenous fertilizers	1.0 "
5	Fallow, cropped (potatoes)	Manure	30 tons
		Phosphorite meal	6 cent.
		Potassium salt	1 "
6	Winter rye	In first supplemental feeding:	
		Nitrogenous fertilizers	2 "
		superphosphate	2 "
		potassium salt	1.5 cent.
		In second supplemental feeding:	
		nitrogenous fertilizers	1 cent.
		superphosphate	2 "
		potassium salt	1 "
7	Potatoes	Manure	15 tons
		Peat	20 "
		Potassium salt	2 cent.
		nitrogenous fertilizers	1 "
		superphosphate	3 "
8	Spring wheat	Manure	15 tons
		Potassium salt	1 cent.
		Superphosphate	3 "
		nitrogenous fertilizers	2 "

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 24.

Number of field	Crop sequences	Fertilizers per ha
	In a nine field field-crop rotation	
1	Perennial grasses of 1st year	Granular superphosphate, 1 cent. at seeding time. After each mowing of grasses, supplementary food is broadcast under the harrow: superphosphate at 1.5 cent. and potassium chloride at 0.5 cent.
2	Perennial grasses of 2nd year	After mowing - supplemental feeding with 1.5 cent. of superphosphate. Plants grown for seed [semenniki] are fed additionally with magnesium boron fertilizer at the rate of 0.3 cent.
3	Spring grain crops	0.5 cent. ammonium nitrate, 1 cent. superphosphate and 0.5 cent. of potassium chloride given during fall plowing. Granular superphosphate given in amount of 0.5 c simultaneously with seeding in rows.
4	Potatoes, early 70%, vetch-oats 30%	Manure in amount of 25 tons in compost with 5 cent. of phosphorite meal, and 1 cent. of potassium chloride during fall plowing or during second plowing in spring.
5	Winter rye	0.5 cent. of granular superphosphate at time of seeding. Supplementary spring feeding with 1 cent. of ammonium nitrate.
6	Potatoes, late	Organo-mineral mixture: 5 tons humus, 3 cent. ashes, 1 cent. ammonium nitrate, 2 cent. superphosphate and 0.5 cent. potassium chloride - at the time of planting under tubers.
7	Spring grain crops	0.5 c of granular superphosphate at time of seeding.
8	Clean fallow	25 tons of manure composted with 5 c of phosphorite meal and 1 c of potassium chloride during second plowing. Lime in amount of 2-4 tons, in relation to soil salinity, in cases of double fallow [pri dvoike para] or in preseeding cultivation.
9	Winter wheat with supplementary seeding of grasses	Granular superphosphate in amount of 0.5 c at time of seeding. As supplementary feeding, 1 c of ammounium nitrate broadcast in the spring.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 24 (continued)

Number of field	Crop sequences	Fertilizers per ha
	In a nine field forage crop rotation	
1	Perennial grasses for hay	Granular superphosphate in amount of 1 c at time of seeding. 2 c of superphosphate and 1 c of potassium chloride in supplementary feeding.
2	Perennial grasses for green fodder	Superphosphate - 2c, and potassium chloride - 1 c for supplementary feeding after the grasses have been mown.
3	Perennial grasses for pasturage	Superphosphate - 2 c, potassium chloride - 1 c, ammonium nitrate - 1 c in supplemenatry feeding.
4-5	Same	Ammonium nitrate - 1 c in supplemenatary feeding.
6	Silage crops (sunflower)	Superphosphate in amount of 3 c and 2 c of potassium chloride. 1 c of ammonium nitrate during preseeding tillage. 1 c of superphosphate at time of seeding. 0.5 c of ammonium nitrate in supplementary feeding.
7	Winter rye and vetch-oats for green fodder	Superphosphate in amount of 0.5 c at time of seeding.
8	Root crops for forage	30 tons of manure composted with 5 c phosphorite meal, 2 c of potassium chloride, lime (in relation to acidity of field soil) during plowing. 1 c of ammonium nitrate during preseeding tillage. 1 c of superphosphate at time of seeding.
9	Oats with supplementary seeding grasses	0.5 c of potassium chloride during plowing. Ammonium nitrate in amount of 1 c during preseeding tillage. 0.5 c of superphosphate at time of seeding.
	In a seven field crop rotation near farmhouses	
1	Perennial grasses for green fodder	Granular superphosphate in amount of 1 c at time of seeding. 2 c of superphosphate and 1 c of potassium chloride in supplementary feeding.
2	Same	Superphosphate in amount of 2 c and potassium chloride - 1 c in supplementary feeding.
3	Perennial grasses for pasturage	Superphosphate in amount of 2 c and potassium chloride - 1 c in supplementary feeding.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 24 (continued)

Number of field	Crop sequences	Fertilizers per ha
4	Perennial grasses for pasturage	Ammonium nitrate in amount of 1 c in supplementary feeding.
5	Perennial grasses for green fodder	Granular superphosphate in amount of 0.5 c at time of seeding
6	Same	Superphosphate in amount of 1.5 c and potassium chloride - 1 c during plowing. Granular superphosphate - 0.5 c at time of seeding.
7	Winter crops for green fodder with supplementary seeding of perennial grasses	Ammonium nitrate in amount of 0.8 c during preseeding tillage. 0.5 c of granular superphosphate at time of seeding.

Table 26.

Number of field	Crop sequences	Type of fertilizer	Fertilizer per ha (in c)
1	Perennial grasses	Lime	15.0
		Superphosphate	3.0
		Potassium chloride	2.0
2	" "	Superphosphate	1.5
		Potassium chloride	1.0
3	Spring wheat	Granular superphosphate	1.5
		Potassium chloride	1.0
		Ammonium nitrate	101.5
4	Potatoes	Manure	100
		Ammonium nitrate	2.0
		Superphosphate	3.0
		Potassium chloride	2.0
5	Fallow, cropped (Vetch-oats for hay)	Ammonium nitrate	1.0
		Superphosphate	2.0
		Potassium chloride	1.0
6	Winter rye	Ammonium nitrate	1.0
7	Oats	Superphosphate	0.5
		Ammonium nitrate	1.0
8	Fallow, clean	Manure	200
		Superphosphate	1.5
		Potassium chloride	1.0
		Phosphorite meal	4.0
9	Winter wheat with supplementary seeding of clover and timothy	Ammonium nitrate	1.5
		Superphosphate	1.5

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

CHAPTER VIII. SOWING OF WINTER RYE

Table 26.

Government standard for sowing properties of winter rye seed

Class No.	Purity of rye seed (in %)	Waste of rye seed and admixtures (in %)	Including at most		Germination at least (in %)	Moisture at most (in%)
			Seed of other plants (in num. per kg)	Among them weed seed (in number per kg)		
I	99.0	1.0	10	5	95.0	15.0
II	98.5	1.5	100	50	90.0	15.0
III	97.0	3.0	200	100	90.0	15.0

Table 27.

Rate of winter rye seeding in regions of the central belt
(Recommended by the State Commission for variety testing of grain crops, oil crops and grasses at the Ministry of Agriculture, USSR)

Region and Autonomous SSR	Zone	Variety	Rate of seeding per ha	
			In mln. of germinative grain	in kg
Vladimir	Throughout region	Viatka	6.0--7.0	170--180
Gorki	I, II, III, IV	Viatka	6.0	150
Ivanov	V, VI	Kazanskaia	6.0	160
Kaluga	Throughout region	Viatka	6.5--7.0	170--180
	I, II, IV	Viatka	6.5--7.0	170--180
	III	Novozybkovskaia	6.5--7.0	170
Kostroma	Throughout region	Viatka	6.0	175--185
Mordovian ASSR	" "	Kazanskaia	5.5--6.0	150--160
		Lisitsyna	5.5--6.0	140--150
Moscow	" "	Viatka Moskovskaia	6.5--7.0	170--180
Riazan	I, II	Voronezhskaia SKHI	6.5	160
	III	Same	6.0	150
Tula	Throughout region	Lisitsyna	7.0--7.5	170--180
Iaroslav	" "	Viatka	6.0	170--180

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

CHAPTER X. HARVESTING OF WINTER RYE

Table 28.

Members of thresher brigades and assignment of kolkhozniks to their separate jobs

Operator's place	There is a demand for kolkhozniks when threshing is done with threshing machines of various trade-marks				
	MSO-1100	MKS-1100	MO-900 BDC-54	4-horse drawn	8-horse drawn
Machinist	1	1	1	-	-
Tractor operator and motorist	1	1	1	-	-
Driver of horses	-	-	-	1	1
Person conveying sheafs onto platform or to self-feeder	4	4	3	1	2
Binding cutter on platform	-	3	2	1	2
Drummers-operators of toothed planes [barabanshchiki; ubari]	-	2	2	1	1
Straw rakers who stack it in screens [setki]	4	4	3	1	2
Straw transporters	1	1	1	1	1
Drawing off cable rope in cable scraping	1	1	1	-	-
Stacking experts	3	3	2	1	1
Straw rakers	-	3	2	1	1
Chaff trnasporters	-	1	1	1	1
Stackers of chaff onto screens	1	1	1	-	-
Persons removing grain from-under thresher	4	3	2	-	-
Cleaning of grain	2	4	3	5	6
Weighing of grain	1	1	1	1	1
Night watchman	1	1	1	1	1
Water carrier	1	1	1	-	-
Total	25	35	28	16	20

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Mosolov, I. V., and Volleidt, L. P.

Postuplenie sery v rastenila pri kornevom i vnekornevom ee vnesenii.

[Entry of sulfur into plants during root or leaf-feeding].

Udobrenie i Urozhai, vol. 1, no. 8, p.13-17, Aug. 1956. 67.8 Ud72.

(In Russian)

It has been established at the present time, that many of the most important elements of mineral nutrients of the plant food have an ability to move within the plant both in an ascending and a descending direction. Nitrogen, phosphorus and potassium belong to these in the first place. These elements enter into the composition of various organic compounds, take part in the circulation of substances in the plant and can be utilized repeatedly.

Together with this group of compounds there is another group of substances, which are similarly indispensable to the plants' metabolism, but which are not able to take part in a repeated utilization; for instance, iron, manganese, zinc, boron and others.

In literature, up to the present time, there is no definite opinion in respect to such an important element of plant food as sulfur on the problem of its movement in the plant and on its re-utilization. For instance, Ergle D. K., on the basis of his experiments with cotton, assumes that sulfur cannot be re-used (1). Other authors (2,3) note, that not all the compounds of sulfur are not mobile. Sulfates, which under normal conditions are always accumulating in the plant, are distinguished by a greater mobility, than sulfur of organic compounds (especially of proteins), and can be utilized by the plant a second time.

A 772

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

In order to decide the question about the movement of sulfur in the plant, and about the possibility of its repeated utilization, we conducted experiments on leaf-feeding with bean plants and sunflowers, using a method of tagged atoms (S^{35}).

Bean plants were grown in sand cultures on Knop's nutrient solution, in vessels of 8 kg holding capacity of sand. Each vessel had 2 plants. At the beginning of blooming the leaves of bean plants were moistened with a 0.6% solution of $K_2S^{35}O_4$, with an activity of 50 μc*/ml. In one of the vessels a young, growing leaf (third trifoliate leaf from the bottom)of the bean was moistened and in another vessel a leaf, which stopped its growth (first trifoliate leaf). The leaves were moistened during evening hours two days in succession. After 12 days an evaluation of the S^{35} activity on a setting of type "B" was conducted for different parts of the plant with a weighed portion of rubbed dry material, equaling 20 mg.

Results of the evaluation of the S^{35} activity are given in table 1 and figures 1 and 2. From the obtained data one can see that sulfur, which was deposited on the upper leaf moved first of all into a young bean, then into a young leaf and then into the roots. The largest amount of S^{35} was found in the bean, which was formed in the base of the leaf moistened with the S^{35} solution. Sulfur almost did not move from the young leaf into the old leaves. In another experiment where only a comparatively old leaf was moistened (the first trifoliate leaf), sulfur was found in all parts of the plant: leaves, beans, stalks and roots. [Begin p. 14].

---

* μc = micro Curie

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Distribution of sulfur in different parts of the bean after feeding it through the leaves

The upper growing leaf was moistened (3rd-trifoliate), fig. 1		First trifoliate leaf was moistened, fig. 2	
Organs	S^{35} activity in imp/min per 20 mg of dry substance	Organs	S^{35} activity in imp/min per 20 mg of dry substance
Single leaf	19	First trifoliate leaf	19 968
First trifoliate leaf (I)	4	Second " "	62
Second " " (II)	9	Its petiole	16
Its petiole	253	Bean in the base of the 3rd leaf	155
Third trifoliate leaf (III)	31376	Fourth trifoliate leaf	105
Bean at the base of the III leaf	2889	Its petiole	80
Stalk, between the root and the single leaf	41	Bean at the base of the 4th leaf	100
Roots	153	In stalk fragments:	
Leaf was formed after 14/VII at the base of the 1st leaf	121	Between the root and the single leaf	269
Its petiole	7	Between the single leaf / 1st trifoliate	338
		Between the 2 and 3rd trifoliate leaf	132
		Between the 3 and 4th trifoliate leaf	146
		Roots	319

Figure 1. The upper trifoliate leaf was moistened on 14/VII; on 14/VII a bean was formed at the base of the moistened leaf; on 27 - VII, 1955 the plants were harvested.
Words in the figure. On the left side of the stalk: Leaf formed after 14. VII; a bean (2889). Right side, top to bottom: 3rd trifoliate leaf; second trifoliate leaf; first trifoliate leaf; single leaf; roots.

Figure 2. First trifoliate leaf moistened on 14/VII, 1955. Plants harvested on 27/VII, 1955.
Words in the figure. On the left side of the stalk Bean (100); bean (155); 1st trifoliate leaf. Right side, top to bottom: 4th trifoliate leaf; 2nd trifoliate leaf; single leaf; roots.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Yet, S^{35} contents in different parts of the plant were unequal: younger leaves contained more sulfur than the old ones. Sulfur also distributed itself unevenly in the stalk: the lower part of the stalk [Begin p.15] (below the moistened leaf) contained more sulfur than the upper (over the moistened leaf).

At the same time it is necessary to note that the movement of sulfur along the bean plant organs depends on which leaf was moistened: the upper young one or the lower old one.

From the upper young leaf sulfur (S^{35}) moved in a large amount into the bean, but from the lower old leaf, on the contrary, sulfur moved to the roots and not to the reproductive organs.

Similar data about the distribution of sulfur in the plant, when it was introduced through the leaves, were also obtained by us in an experiment with sunflowers.

The experiment with sunflowers was conducted in water cultures with Knop's nutrient solution in vessels of 5 liters holding capacity. Three plants were grown in each vessel. Before the beginning of the experiment the sunflowers were grown in Knop's nutrient solution without sulfur.

On August 26 the third pair of sunflower leaves was moistened with 0.5% solution $K_2S^{35}O_4$ with an activity of 50 μc/ml. At this time the sunflower already had 6-7 well developed leaves.

On the next day after introduction of S^{35}, that is on 27/VIII, the evaluation of the activity of sulfur on an apparatus of the "B" type was conducted on small discs, d= 1.5 cm, which were punched out from the leaves. Results of the evaluation are given in table. 2.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 2.

Activity of S^{35} in imp/min per one disc of a d = 1.5 cm

Time of evaluation	Leaves counted from the bottom. S^{35} introduced to 3rd leaf						
	1	2	Leaf moistened with S^{35}	4	6	10	12
Evaluation on 27/VIII	-	48	undetermined	0	was not determined		
Evaluation on 8/IX	-	102	3779	83	124	310	391

From data of table 2 one can see that sulfur (S^{35}), which was introduced to the 3rd leaf from the bottom, could, on the next day, that is on 27/VIII, be found already in the second leaf, below the moistened one. In the 4th leaf, which was above the moistened, S^{35} was not found. When evaluating sulfur on 8/IX S^{35} was found not only in the lower leaf, but also in the leaves situated above the moistened. Hence one can conclude, that sulfur which was applied to the leaf, moves from it first of all into the lower, and after that into the upper leaves. At the same time one should note that sulfur (S^{35}) concentrates mostly in young growing leaves, that is in those leaves where the process of synthesis of protein substances proceeds most energetically. Contents of sulfur in the lower leaf increased also on the second date of evaluation. If on 27/VIII the second leaf had an activity of 48 imp/min, then on 8/IX it was 102 imp/min.

Thus, on the basis of data of experiments with bean plants and sunflowers one can make a conclusion that sulfur, given to the plant through the leaves, initially moves toward the transpiration flow and becomes concentrated mainly in the energetically growing organs. Confirmation of this conclusion we find in the work of Thomas (4), where it is shown that during leaf-feeding sulfur is moving against the transpiration flow.

An experiment on feeding sulfur (S^{35}) through the roots was conducted with a sunflower in water cultures growing in Knop's nutrient solution. Before the formation of [Begin p.16] 10 regular leaves, that is up to 19/VIII the leaves

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

were grown in a nutrient solution without sulfur, and beginning with 19/VIII part of the plants were transplanted to a solution containing the sulfur isotope (S^{35}) in an amount of 150 mc per 6 L. of solution and grew in it to the end of the experiment (table 3, variant 1), and another part was in solution containing S^{35} during the course of 20 days, beginning with 19/VIII and up to 7/IX. After this the plants were again transplanted into a solution without sulfur (variant 2).

Evaluation of S^{35} activity was conducted on small discs, d = 1.6 cm, which were punched from the leaf blade. Data about the activity of sulfur, which were obtained in this experiment, are cited in table 3.

Table 3.

Activity of S^{35} in imp/min per disc, d = 1.6 cm, from the leaf

Variants	Date of evaluation	Order of grouping of leaves from below									
		1	2	3	4	8	10	12	14	16	Inflorescence
Feeding S^{35} 19/VIII to the end of the experiments	25/VIII	7	80	238	499	-	-	-	-	-	-
	5/X	-	524	914	-	1112	1468	1604	1648	1696	969
Feeding S^{35} since 19/VIII up to 7/X	6/IX	-	-	-	-	748	776	748	693	-	-
	22/IX	-	-	-	-	654	602	564	617	578	-
	3/X	-	-	-	-	485	598	593	407	495	231

It is seen, from data in table 3, that the entrance of sulfur (S^{35}) into the leaves of the sunfower basically depends on their age. The younger is the leaf the more sulfur enters into it. That is why the leaves (12-16th), which were formed during the period of S^{35} feeding, contained the greatest amount. At the same time it should be noted, that with age the contents of sulfur in the leaves were increasing.

For instance, on the 25/VIII the activity of S^{35} in the third leaf was

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

238 imp/min, and on 5/IX - 914 imp/min. Besides this, when feeding the sunflower with sulfur during a certain period, as it took place in our experiment (variant 2), it enters not only into those leaves which were existent at the beginning of the experiment, but also into the leaves which appeared during the experimental period. Cessation of feeding the plants with sulfur is accompanied by a decrease of its content in the older leaves at the expense of moving into the young ones, appearing after the removal of sulfur from the nutrient solution, as well as into the inflorescenes.

Distribution of sulfur in individual organs of the sunflower was studied in this same experiment, and, in particular, in the blades of the leaves, petioles and stalks. Evaluation of the activity of S^{35} was conducted with a dried weighed portion, equaling 20 mg. Data about the S^{35} activity in leaves, petioles and stalks of the sunflower are given in table 4.

From data in table 4 one can see, that the contents in the blade of the leaves are much higher, than in petioles, whereupon in young leaves there is more of it, than in the old ones. Contents of sulfur in petioles, regardless of their age and their location along the stalk were alike. Similar data are to be found in other works too.

Particularly Fried (6) has shown, that the young organs are the richest in sulfur (S^{35}). [Begin p. 17].

Table 4.

Activity of S^{35} in different parts of the sunflower in imp/min per 20 mg of dry substance

Organs	Order of leaves' grouping is from below			
	4	5	6	9
Leaf	1234	1879	1774	1921
Petiole	undetermined	523	598	570
Parts of the stalk from the 3rd to 5th leaf	625	575	undetermined	

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

On the basis of conducted researches it is possible to make the following conclusion.

During root-feeding sulfur (S^{35}) enters into all the organs of the plants, but not in equal amounts. The highest content of sulfur is noted in young, active leaves and in the reproductive organs. Into the old leaves sulfur enters in considerably smaller amounts.

During leaf-feeding sulfur (S^{35}) enters not only into the reproductive organs and into the young leaves, but also into the roots. During leaf-feeding of sulfur (S^{35}) it almost does not enter the old leaves.

During leaf-feeding sulfur moves first of all in a descending direction, and after that in an ascending.

With the cessation of feeding the plants with sulfur, the plant draws it from the old leaves.

List of Literature

1. Ergle D. R. Bot. Gazette, 1953, 114, No. 4.
2. Mothes K. Planta, 1939, Bd 29, H 1.
3. Kylin Anders. Physiolog plantarum 1953, 6.4.
4. Thomas M. D. Soil Science 1950 v. 70 no. 1.
5. Fried M. Soil Science of Amer. Proceeding 1949, v. 13, S 135-138.

Society

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Burkin, I. A.

Zashchita rastenii ot zamorozkov putem opryskivaniia, dozhdevaniia i poliva vodoi.

[Protection of plants from frosts by spraying, sprinkling and watering].

Dostizheniia Nauk I Peredovogo Opyta v Sel'sk. Khoz., no. 3, p. 91-95.
March 1963 20 D742

(In Russian)

Injuries caused by spring frosts to the flowers and sets of fruit trees, grapes, vegetable sprouts, melons and technical crops incru losses of millions of rubels in every oblast of the USSR.

The occurrence of late spring frosts makes it necessary that many crops be transplanted from hothouses into open ground in late spring. This practice results in low yields.

Table 1.

Influence of planting dates upon the yield and quality of tomato fruits

(According to data of the Smolenck Base)

Planting time	Yield (in centners per ha)		Increase in yield of red fruits (in c per ha)
	Gross	Red fruits	
July 7th	192.5	112.5	-
May 20th	258.9	230.4	118.1

A similar increase in yield is observed also in other crop varieties, if their seedlings are transplanted a little earlier (cotton, tobacco, castor plant).

A 773

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Summer frosts prevent cultivation of grain crops in the Extreme North, because they kill all surface organs of the plants. Hence protection against frosts is a prerequisite if crops are to be moved toward the North. Methods of crop protection against frosts have been developed through the centuries, but they require much capital, manpower and materials. Smoke screens recommended in literature call for 60 to 100 tons of material. Besides, the smoke is easily carried off by wind.

Formation of artificial fogs calls for a large number of smoke canisters and for chemicals, but they are as unstable as smoke screens. Artificial warming of the air with petroleum and coal heaters is also too expensive. Water spouts [massifs] have long since been considered as a means in bringing about a change in microclimate. Some authors have recommended their use before frost sets in, others - after it. Results obtained from irrigation and sprinkling of plants with water varied. At times the effect produced was positive, at others - negative. Heat of water exceeds that of the air and of many solid bodies and liquids. Hence the use of water as a safeguard against frosts deserves consideration.

In our experiments we sprayed potatoes with small amounts of water at the rate of 1 to 2 cub. meters per hectare. The river water used was 4° C. Sprinkling was conducted when frost had set in and air temperature on the soil surface and in the vegetation cover had dropped to 0°. Up to 2.5°, spraying at 15 minute intervals for the duration of the frost was sufficient. At a 4.5° frost, complete protection was achieved by spraying plants every 7-8 minutes. In the night of September 6-7, 1956, when air temperature had dropped to 4.5° on the soil surface (for a period of 9 hours), plants were safeguarded by spraying at 7-8 minute intervals (table 2).

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Injury of potato leaves caused by frost in the night of September 6 to 7, 1956

Experimental variation	Injured leaves (in %)
Control (not sprayed)	100
Spraying with water before frost set in	100
" " " after frost	100
" " " during frost at 7-8 minute intervals	0
" " " " " " 15 " "	55.4
" " " " " " 1, 2 and 3 hour intervals	100

The table shows that upon spraying at 15 minute intervals, only 55.4% of the leaves were saved, and upon spraying every 1, 2 and 3 hours, all leaves and stems were destroyed the same as in pre-frost and after frost spraying.

Experiments have shown that periodic spraying of plants with water is a completely effective protective measure. Spraying plants with water can be accomplished with centrifugal and long distance flow watering equipment, and with a double-console sprinkling apparatus, as well as with short-flow sprinklers. Farms which have no sprinkling equipment can use horse-drawn and automobile mounted sprayers. On small areas spraying cans can be utilized. It is quite possible that this system will prove effective not only for vegetable crops, but also for fruit crops and grapes at the time of flowering. Late spring and early fall frosts are less severe in southern oblasts than in those higher up north, hence spraying in the south can be conducted at greater intervals. This method should be tested extensively. However, sprinkling at 7-8 minute intervals will protect also plants adapted to a warm climate.

Kol'skii Filial AN SSSR

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

1-775
(Abstract)
VG/M

A
775

Tiurdenev, A.

Vyrashchivanie ovoshchei na Krainem Severe.

[Growing vegetables in the Extreme North].

Sad i Ogorod, no.11/12, p.78-80. Nov./Dec. 1946 80 Sa13

(In Russian)

In 1925-1926 a young agriculturist, who now is an active member of the Academy of Agricultural Science, I. G. Eikhfel'd, (began) to bring the tundra on Kol'ski peninsula under cultivation. He organized there the Khibinskaia Experiment Selection Station. Before the October revolution there were plantings of turnips in some points on Kol'skii peninsula. In 1926 the whole planted area equaled 14 ha. But after a short while on the peninsula the Soviet people began to grow on a wide scale vegetables, potatoes, grains, root-crops, fruit and berry crops.

Following the Murman development of agriculture, it was also started on Igarka, Kolym, Vorkuta, in Noril'sk, Nar'ian-Mara, Salekharda, Kamchatka, and so on. In the tundra, in the forest-tundra and in the taiga grew up sovkhozes, experiment stations, green fields and vegetable gardens of kolkhozes.

At the same time in the Arctic regions on the islands, and shores of the Arctic Ocean appeared hothouses, hotbeds, and even sections with early-ripening vegetables. The northern limit of agriculture reaches up to the 68-69° north latitude. Here, in open ground, are grown potatoes, cabbage, kohlrabi, winter rape, carrots, beets, onion, turnip, radishes, spinach, lettuce, and others.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The most northern sovkhozes at 69° north latitude in 1943 obtained yields per ha: of potatoes - 160 c, cabbage - 266-308 c, turnip (Brassica rapa) - 84 c.

But in 1943, the co-workers of the Bulunskii Deer-growing Experiment Station, of the Institute of Arctic Agriculture, A. A. Ivanov and M. A. Bushenko, organized an experimental section at 71° north latitude in the Bulunskii raion of the Iakutskoi ASSR.

The sprouts were grown there on windows, and after the 20th of May, they were transferred into hotbeds, made of window frames.

The vegetable section is situated on an ice ridge (subsoil ice) the depth of which was not established. A hole dug to the depth of 6 m was in a solid mass of ice. The layer of soil which thaws out during summer on flat, warmed up areas does not exceed, in June, 22-30 cm, in July 55 cm and in August 60-70 cm. The soils are light, of alluvial origin; the active, plowing layer does not exceed 15-20 cm, and the humus layer - 6-8 cm. The mean temperature of the air in July equaled 11-15° for the period of three years. The period with temperatures above 10° constituted 45-50 days. °C?

The sum total of heat during the vegetative period was from 832 to 1040° C. Frosts are liable to occur during any of the summer months. Cold northern winds of storm strength during the second half of June were accompanied in 1944 by a snowfall. During the windy days the growth and development of plants stops. Total yearly precipitation constituted, on the average, for the last 5 years 221 mm, and for the vegetative period did not exceed 160 mm.

One favorable condition should be noted - the arctic day, which continues for 65 days; from May 20 to July 25. The duration of sunshine at 67° north latitude from June 24 to September 23 equals 1667 hrs whereas in

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

the tropics it is 1211 and on the equator 1128 hrs. The polar day, under conditions of low temperature of air and soil, is the most important condition for plant development.

Many vegetable crops were tested on the experiment section. During two years' time cabbage "Nomer pervyi" and one variety, brought over from America, were thoroughly tested. It was ascertained, that the 50-day-old cabbage-sprouts, which were pricked off into paper or other pots, and which were well developed and strong when transplanted into the soil in the middle of June had time to develop a fully normal head for their variety. In 1945, with good seedlings only 4% did not head, and on warmed ridges, where into the planting hills warm manure was introduced and covered up with earth, cabbage headed to full 100%, and the yield was higher by 20%. The weight of one head reached 3 kg. In 1944, when the seedlings were bad, 40% did not head and the weight of the best head was 1.6 kg.

In 1945 the yield of cleaned cabbage heads was equal to 19.8 t/ha. Besides this there was 12 t/ha of green leaves which were used for fermentation.

Cabbage was grown on ridges. Soil was fertilized with manure - 100 t/ha. Five waterings with manure water were given, and three waterings with an ash solution. The section was kept up in a mellow state, free from weeds, but the cabbage maggot brought much trouble.

Kohlrabi - variety Belyi venskii [White Vienna], was grown for two years. The length of vegetation period - from the planting of seeds up to harvesting - was 90 days. Elective harvesting was done during the second half of August, and the mass harvesting during the first days of September. The yield was 17 to 20 t/ha. The weight of one specimen reached one kilogram. The green leaves of Kohlrabi were also utilized for food, and after

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

harvesting they were salted together with the lower leaves of Chinese cabbage.

In 1944, on June 12, the seedlings of rutabaga, 20 days old, were set out, and by September 10 the roots achieved a weight of from 200 to 500 g. There were no small roots. The yield was in 1944 17 t/ha and in 1945 28 t/ha. The "Monostra" variety gave a larger yield, but its elongated form was a defect under conditions of the constant frozen state of the soil; it developed ramose roots.

Turnips, of Osterzundomskoi Variety succeed, during the short arctic summer, to develop a large root and give a higher yield than rutabaga, but the experiment showed that turnips grow in the upper layer of soil and become deformed as a result of low temperatures and of shallow plowed layer of soil. A short rooted variety of turnips should be used here.

Beets, when the seedlings were well prepared (pricked off into glasses) and set out when 30-45 days old, gave a yield up to 80 c/ha; the mean weight of a root was 230 g.

Two varieties of carrots were tested. They were planted June 3rd; sprouts appeared on June 24. Harvesting was done in September. Yield was 60-70 c/ha.

The Bulunskii experiment station tested such vegetables as onions, radishes, lettuce, spinach, sorrel. One variety of onion gave an average yield of 30 t/ha. Radishes gave up to 2-2.5 kg per sq. m. Turnips (Brassica rapa) gave on the average in 1944 23 t/ha and in 1945 up to 30 t/ha.

Among the leafy vegetables, lettuce, sorrel, spinach and Chinese cabbage were tested, which gave from 15 to 40 t, when computed for a hectare.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Agrotechnics for growing the root-crops and the leafy vegetables were as follows: tillage of the soil to the depth of a spade, fertilizing in a ratio of 100 t/ha, planting into beds; care consisted of 2-3 supplementary feedings, in loosening the soil and in weeding.

The early-ripening vegetables, such as radishes, spinach, lettuce and Chinese leaf cabbage were also grown much further to the north, in Bukhte Tiksi at 72° north longitude.

The three-year results of the work of this experimental station are especially valuable as they were a sort of scouting and present great possibilities for future development of agriculture in the Extreme North.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

vg/M

Tikhomirov, B. A.

Rost Arkticheskikh rastenii i pogoda.

[Growth of arctic plants and the weather].

Priroda, no. 1, p. 66-69. 1948. 410 P933

(In Russian)

It has been known for a long time that there is an interrelation between the weather and the development of plants. The yearly changes in the growth of plants are of an especial interest in extreme conditions of their existence where the size of plants is naturally smaller.

During the summer of 1946, when we visited the north-western shore of Taimyra River, we collected certain material, which characterizes the growth of arctic plants depending on the conditions of the weather. In the locality of 76° 12' north latitude and of 99° 04' west longitude, where we studied the plants, we repeatedly noted the height of stalks of 1945 plants, which withstood the ravishings of winter. By measuring their height, and the height of the fresh, green stalks of 1946 plants we proved the superiority in the height of the 1945 plants. Usually we measured 5-10 plants of every species for each year. Data, in the following table 1, can serve as a concrete illustration to the above said. The stalks of the 1945 plants were considerably higher than of those, of the same species in 1946. Two or three days after our measurings, a show-fall stopped the growth of the 1946 plants. That this was not a casual observation but a regular phenomenon is seen from the large number of species, which we found. We must keep in mind that in high arctic latitudes the dimensions of plants are usually very small.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

A special difference in the height of plants is seen among the grains (from 5 to 14 cm); apparently they react sharply to the changes in the living conditions.

In order to explain this phenomenon we analyzed the weather conditions for these two years. Table 2 gives data for the vegetative periods of 1945 and 1946 for this locality. It is interesting to note that May had totally negative temperatures, which at times reach 20° (at the beginning of the month) and has a mean monthly temperature of - 10°,-12°.

Table 1.

Height of plants in 1945 and in 1946 as measured in the estuary of the river N. Taimyra.

Name of plants	Average height of plants in 1945 (in cm)	Average height of plants in 1946 (in cm)	Excess in the average height of plants in 1945 as compared to the height of plants in 1946 (in cm)
Arctagrostis latifolia (R. Br.) Griseo	26	16	10
Atropis taimyrensis Rosh.	22	18	4
Deschampsia borealis (Trautv.) Rosh.	24	18	6
Festuca brevifolia R. Br.	15	10	5
Poa alpigena (Fries.) Lindm.	32	23	9
Poa alpigena var. vivipara Lindm.	35	21	14
Carex misandra R. Br.	15	10	5
Juncus biglumis L.	16	10.3	4.7
Polygonum viviparum L.	11.5	10	11.5
Cerastium Bialynickii A. Tolm.	16	13	3
Ranunculus nivalis L.	14.7	7.7	7
Papaver lapponicum orientale A. Tolm	16	13	3
Papaver radicatum polare A. Tolm.	14.6	9.7	4.8
Eutrema Edwardsii R. Br.	12	11	1
Cardamine bellidifolia L.	8	6	2
Draba barba a Pohle	9	6	3
D. glacialis Adams	13	9	4
D. lactea Adams	7.5	5.8	1.7
D. macrocarpa Adams	8	4.5	3.6
D. micropetala Hook.	6.5	4.5	2
D. oblongata R. Br.	7.5	5	2.5
D. pilosa D. C.	4	3	1
Saxifraga caespitosa L.	7	5	2
S. Hieracifolia W. et K.	20	16	4
Myosotis asiatica (Vest.) Schischk. et Serg.	11	10	1

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 1. continued

Name of plants	Average height of plants in 1945 (in cm)	Average height of plants in 1946 (in cm)	Excess in the average height of plants in 1945 as compared to the height of plants in 1946 (in cm)
Pedicularis hirsuta L.	8.7	6.7	2
P. sudetica Willd.	13	6	7

When working on the herbarium, which we collected, both in 1945 and 1946, on the above cited latitudes we had additional data, which testify that the difference between the height of plants in 1945 and in 1946 did not bear a local character, but were widespread.

Continuing our weather analysis, we saw that, as a rule, until the third part of June the temperature continues to be on the negative side, and the mean temperature of the air in June was about 0-0.2°.

A. I. Zubkov, in his article on vegetative periods in the Arctic region, says that the mean daily temperatures of the air, which are taken by the meteorological stations 2 m above the earth, cannot be used for evaluating the length of the vegetative period, because they do not reflect the microclimate, nor the location of plants. (Arctica, no. 3, p.154 L., 1935). Not having other temperatures but those of the meteorological stations, we must use them for our research.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 2.

Temperature data for the vegetative periods in 1945 and 1946 as observed on the estuary of the river N. Taimyra.
(Mean daily temperature of the air)

Date \ Month and year	July		August		September	
	1945	1946	1945	1946	1945	1946
1	9.8	2.8	4.4	0.8	4.0	1.1
2	1.4	1.9	1.1	2.8	5.1	1.1
3	7.5	1.2	16.9	2.8	1.0	4.2
4	11.2	3.2	17.7	2.0	1.2	1.4
5	1.2	5.5	18.9	4.7	1.8	--0.7[1]
6	6.8	1.4	6.9	0.5	0.6	--0.9
7	8.2	2.6	4.2	0.6	0.6	--2.3
8	8.1	7.8	4.3	0.7	--1.8	--1.7
9	8.1	1.9	2.6	0.7	0.1	
10	11.4	0.8	4.3	2.5	1.0	Data is
11	12.8	--0.3	2.0	1.2	1.2	absent
12	14.0	--0.7	1.2	0.5	0.8	
13	6.2	--0.2	5.2	0.1	--0.7	
14	17.2	1.6	2.0	0.0	0.7	
15	8.6	0.4	0.9	0.1	--1.8	
16	8.0	1.4	8.0	--0.9	--0.2	
17	8.2	4.8	1.4	0.8	--3.0	
18	8.4	9.9	2.8	3.0	--0.5	
19	1.7	12.0	3.2	2.9	--0.1	
20	2.0	5.8	1.4	2.9	--0.7	
21	5.0	6.5	0.8	--1.2	--0.4	
22	5.1	10.6	1.6	4.2	--2.0	
23	9.0	7.8	4.1	0.4	--1.1	
24	9.9	11.8	2.9	0.7	--4.1	
25	9.6	8.1	3.8	--0.4	--6.0	
26	8.6	5.2	0.9	0.2	--4.8	
27	2.2	6.4	4.7	0.0	--1.5	
28	1.8	2.4	2.7	--0.8	0.6	
29	0.8	1.2	9.8	--1.2	--4.0	
30	0.6	9.0	2.6	0.0	--0.1	
31	0.2	4.4	2.7	--0.2		
Mean for the month	5.9	4.2	4.9	1.0	--0.6	

(1) Snow fell, which did not thaw, but remained for the whole winter. In 1945 the permanent snow cover was established 10 days later.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

One should note the substantial differences in temperature for the two vegetative periods, which are compared, especially for those months which are the most important for the plant's life in the Arctic, namely July and August.

As it also can be seen from data of A. I. Zubkov, who made observations at approximately the same latitude, the plants are only beginning their vegetation in June, and the greatest development must be in July and August.

The difference in temperature conditions can be seen sharply in table 3.

The noted difference in conditions of warmth occurs in September also. Thus the permanent negative temperatures and the snow covering in 1945 were established only in the middle of September, whereas in 1946 the snow fell already on September 5. In the light of these data one can understand this difference, which we cited above, between the height of plants in 1945 and 1946, even if the plants in the Arctic region are of diminutive dimensions.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 3.

Difference in temperature conditions in July and August of 1945 and 1946 in the estuary of the river N. Taimyr.

	1945	1946	Remarks
Number of days with negative t° in July	-	3	
Number of days in July with t° to 1°	3	2	
Same with t° from 1° to 3°	7	10	
Same with t° " 3° to 5°	6	4	
Same . . . with t° above 6°	15	12	
Maximum t° in July	17.2°	12°	
Mean t° in July	5.9°	4.2°	Difference of 1.7°
Number of days with negative t° in August	-	6	
Number of days in August with t° to 1°	3	15	
Same with t° from 1° to 3°	15	8	
Same with t° " 3° to 5°	8	4	
Same . . . . . with t° above 6°	7	-	
Maximum t° for August	18.5°	4.7°	
Mean t° in August	4.9°	1°	Difference of 3.9°

In 1946 the conditions for the existence of plants were so critical in the estuary of the river N. Taimyr that the seeds could not ripen. Apparently the ripening of seeds during more favorable years is a widely spread phenomenon for many arctic plants, but in 1946 we had no success in our trials to collect seeds. Under these hard conditions of the 1946 summer some varieties sprouted a rosette of young leaves and a shoot, hardly noticeable above the earth at the beginning of September. The delay in the development of these plants might result from their southern origin.

Many plants went under the snow covering in full bloom without it seeming harmful to them. Some of them continued to bloom under light snow, although we had the opportunity to observe them for a few days only. The abundance of plants, which were covered by snow in their full bloom, only testifies to the extremely shortened and rigorous, in its climatic character, vegetative period of 1946.

Such periods must have been repeated in the past very often and this

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

brought the arctic plants to an abnormal curtailment of their functional activity, and, especially, of their generative propagation. Only the means for vegetative propagation and the reserve plastic substances gave the plants possibilities to overcome such climatic misfortunes.

The above cited observations point to the urgent need for detailed bioclimatic research on arctic stations along the coast of the Arctic ocean, as they will help considerably in the development of methods for plant propagation in the Arctic region.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

A
777

Geodakian, O. A.

Agronomicheskaia otsenka klimata pri raionirovanii sel'skokhoziaistvennykh kul'tur.

[Agronomic evaluation of climate in regionalizing agricultural crops].

Akad. Nauk Armianskoi SSR, Izv. Biol. i Sel'skokhoz. Nauk, Vol. 9, no. 2, p.63-66. Feb. 1956. 20 Er4

(In Russian)

Problems of efficient distribution of the branches of agriculture require most thorough study and complex treatment.

It is known that in planning the distribution of some types of agricultural crops, the importance of soil-climatic conditions which constitute external environment and consist of a series of unequal factors, is just as important as social-economic factors.

Whenever the topic is agriculture, it is understood that soil is implied. Soil areas unsuitable for agriculture (saline soils, swamps) are, however, comparatively limited and are of interest in micro-regionalizing. In regionalizing agricultural crops, problems connected with the soil cover should attract the due attention of agronomists along with the investigation of other environmental factors.

Principles of agricultural evaluation of climate are based on the premise [1, 2, 3, 4] that individual climatic factors and their distinct intensity are not of equal importance to agricultural production. While light, heat, air and moisture form the basis of organism activity, other meteriological factors are of subordinate importance; they acquire inde-

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

pendent significance only when their intensity attains great magnitude (hail, hot dry winds, wind etc.).

While the action of light, air, moisture and heat are an indispensable condition in every period of plant life everywhere, the action of secondary factors extends only over limited areas, and then not always.

Calculation of the intensity of light in regionalizing agricultural crops ought to be a subject of micro-climatic investigation, since its modification which is connected with the geographic latitude is considerably less than a modification due to the influence of topography, exposure and the character of the distribution of plant communities, etc.

Light intensity acquires great importance in mountain countries when crops move to new districts. Thus, for instance, experiments conducted by the Selection Section of the Institute of Wine Industry and Grape Culture /6/ have demonstrated that in the advancement of grapes from lowlands onto new, mountainous districts, the plant must adapt itself not only to different temperatures, but also to a new regime of photosynthesis.

As P. I. Koloskov [6] justly notes, climbing mountains has much in common with the movement of crops from the south to the north. This phenomenon applies not only to perennial crops, but also annual ones.

It is understood that, in such cases, plants demonstrate a certain photoperiodic reaction only to a change in temperature.

In the light of these aspects, much attention should be paid to the works of Prof. M. G. Tumanian [7], who was the first to obtain soft wheat from hard wheat under changed mountain conditions.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Thus, in agroclimatic regionalizing of agricultural crops, the leading factors should be temperature and moisture conditions, yet here, too, it must be noted that, regardless of the great importance of moisture in the life of plants, it plays a passive role in biological processes compared to temperature.

Moisture affects the productivity of a crop to the extent that its deficiency or excess limits the utilization of thermal resources [resursy]. Finally, in a practical solution of the regionalizing of agricultural crops, as a result of the ever increasing measures developed for watering and irrigation of new lands, the moisture requirements of plants can be satisfied more readily by man than could plant requirements of temperature.

The history of plant developement shows that ever since it appeared on dry land it has had to adapt itself to environmental conditions, while the basic compelling factors of environment have been temperature and moisture.

Agronomic science has established that every plant variety begins and ends its vital processes with a certain temperature; the mean temperature at which the normal growth and development of plants occur is customarily called the total of active and effective temperatures. It is understood that the effective temperature-total cannot include either high or low air temperatures which are detrimental during the vegetative period and could lead to an unavoidable disturbance of vital processes. Here it must be considered that in some cases, depending on the species and variety of the plants, certain high and low temperatures can cause temporary cessation of processes or depression, but by no means traumatic injuries.

Thus, the normal growth and development of each plant require optimal conditions of temperature and certain effective temperature-totals. It is

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

natural that, in the event climatic resources have reached the capacity for the adaptation of the plant under investigation and its distribution is dictated by great expediency, creative initiative must be displayed. The words of the great transformer of nature, I. V. Michurin. "We must not wait for the gifts of nature; it is our task to take them from it" ought to find practical application here. (Works, v. 1, p. 605).

In such cases, agronomic practices could be of considerable assistance (agrotechnics, new varieties etc.).

Investigations have established that grape crops begin and end vegetation at a 10°C air temperature, while 30-35° is considered optimal temperature if it is not accompanied by hot strong winds.

Air temperature above 40° exerts injurious action upon the condition of shrubs. A total of 2500° of effective temperatures is the border line for early grape varieties, with a more or less satisfactory quality of the yield.* In areas where the isoline of the mean minimal air temperature does not drop below 15°, the grape vine can be left without a winter cover; yet, if soil temperature drops to 10-11° at a depth of 25 cm, the roots of vine perish. Bioclimatic indicators are apparent not only for the majority of perennial crops, but also for annuals. The realm of distribution of nearly all cereal crops is determined by this criterion.

It is obvious that the realm of distribution of these crop varieties must be defined more accurately, as early-ripe, frosttresistant varieties are developed.

---

* At present great successes are registered in the onward movement of grape crops, and early-ripening varieties which ripen at a total of 2000° of effective temperatures are already available.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Thus, for instance, early-ripe maize varieties now in use accomplish the entire cycle of development at a 1600-2000° total of effective temperatures, medium varieties at 2000-2500°, and late varieties at 2500-3000°. Maize is little resistant to frost, it is impaired at air temperatures of 1-3° and below in all phases of its development. Autumn frosts are especially destructive to maize. Regardless of its great requirements for heat, maize, in some phases, cannot survive very high temperatures; its pollen perishes at temperatures above 35°C, if the action of the latter continues for 1--2 hours. Even though maize thrives in a moist climate, it, nonetheless, utilizes moisture very economically and it belongs to the list of drought-resistant crops. According to various sources, its transpirational coefficient fluctuates in the neighborhood of 200-300.

Leading [farmers] produce high maize yields by utilizing the entire system of agrotechnical practices and by overcoming unfavorable weather conditions.

We have cited these examples so as to illustrate some merits of the method of agronomic evaluation of climatic resources [8].

An agronomic evaluation of climate does not, however, solve problems connected with agroclimatic regionalizing and with recommendations made for a desirable distribution of agricultural crops. At present it is possible, in some cases, to foresee also the quality of the production output in relation to hydrometeorological conditions.

There is available extensive material characterizing the quantitative and qualitative evaluation of the reserve forms of oil, albumin, starch, sugar and other organic substances produced by plants in relation to moisture and temperature.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Data of present-day science permit distribution of agricultural crops not only according to bioclimatic indicators, but also according to directed specialization.

The rich natural resources [usloviia] of Armenia present great possibilities in this direction. The agriculture of the Republic is subordinate to vertical zoning. A climate characteristic of the subtropical belt is observed on a small territory up to the mountain tundra zone. This makes it possible to distribute more efficiently the different branches of agriculture, as well as to lend individual guidance in paint cultivation.

The weighty problem of regionalizing agricultural crops and distributing the branches of agriculture, put before the scientists and production workers of the Republic, must be solved in creative accord by agronomists, soil scientists, agrometeorologists and economists, and with the cooperation of the members of agricultural production.

Received, August 16, 1956.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

REFERENCES

1. Selianinov, G. T. Problem of classification of agricultural crops by climatic criteria. Tr. po Sel'skokhoziaistvennoi Meteorologii, issue XXI, 1930.
2. Selianinov, G. T. Concerning agricultural evaluation of climate. Tr. po Sel'skokhoziaistvennoi Meteorologii, issue XX, 1928.
3. Sel'ninov, G. T.* Method of agricultural evaluation of climate in the subtropics. Materialy po Agroklimaticheskomu Raionirovaniiu Subtropikov SSSR, 1936.
4. Davitaia, F. F. Climatic Zones of Grapes in the USSR [Klimaticheskie Zony Vinograda v SSSR], 1948.
5. Geodakian, O. A. Methods of agroclimatic regionalization. "Izvestiia Armianskoi SSR" (Biol. i Sel'khoz. Nauki), vol. IV, 6, 1951. AN
6. Koloskov, P. I. Agroclimatic Regionalizing of Kazakhstan [Agroklimaticheskoe Raionirovanie Kazakhstana], 1947.
7. Tumanian, M. G. Experimental production of soft wheat from hard wheat. Zhur. "Iarovizatsiia", 2, 1942.
8. Maize goes North. Article in newspaper "Pravda", no. 57, Feb. 26, 1955.

---

* Tr. note: Probably "Selianinov, G. T."

* * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Bogatyrev, K. P.

Luchshie sel'skokhoziastvennye ugod'ia v gorakh Krainego Severa.

[Best agricultural lands in the mountains of the Extreme North [of USSR].

Pochvovedénie, no. 8, p.489-492.
Aug. 1951. 57.8 P54

(In Russian)

A 778

Small and large-scale industries, situated in many mountainous regions of Soviet Union, experience great need for fresh vegetables and for other products from vegetable-raising farms.

To satisfy the needs of the working people some farms near-town were organized, but in many regions this met with certain difficulties. These are especially numerous in the Extreme North, in regions of mountain tundras.

The tundra sections, which are the most suitable for agricultural purposes according to their soil conditions, are usually found along the river valleys, and, chiefly, on bottomland terraces, or on those above them. But owing to the conditions of relief, in most cases it is possible to utilize only separate, comparatively small sections of land. That is why the sel'khozes near town, which are supposed to supply those cities, are often situated at great distances from them, (sometimes up to hundreds of kilometers).

Nevertheless, the total area of those farms is usually far from sufficient. That is why, one of the main problems of the agricultural research in the

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Extreme North is to find additional fertile lands, besides the bottom-lands, in order to widen the local bases for vegetable raising.

Working for many years in mountainous regions of the Soviet Union, I came to conclusion, that a careful exploration of mountain-tundra regions from a geomorphological point of view assists, in almost any region, in finding new lands suitable for agriculture, which are situated outside the river valleys.

Working in the zone of the tundra latitude, I made many trips into the region of the mountains of the arctic Ural. I supposed, that here, owing to soil-climatic inversion, which is linked to the conditions of the mountainous relief amidst spacious "gol'tsovikh" [wooded?] areas, must be found small sections of afforested tundra. The hunters from one of the northernmost reindeer breeding kolkhozes of Komi ASSR have confirmed my supposition and conducted me to some such sections (1).

This section is situated on the south-eastern part of the range, in the region of a strongly denudated gigantic glacial trough. The trough begins at the height [Begin p.490] of 300-400 m in the form of narrow strip of several tens of meters, gradually widening, V-shapedly, toward the bottom to hundreds and tens of hundreds of meters.

The trough-shaped form of such depressions, narrow at the top and wide at the bottom is a dependable protection from severe and strong north-eastern winds, which are prevalent here during the summer period.

---

(1) I want to express my deep appreciation to the men in Eletski kolkhoz "im. Kuybysheva" in Komi oblast", (M. A. Kanev, president) which gave me the possibility to make the needed trips, free of charge, thinking only about the scientific-practical interest of our country; they furnished me with transportation, guides, workers, went with me in boats, on reindeers, on horseback, adding to my observations their valuable information about places seen by them earlier.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Here, usually, is a most heavy snow covering (as the south-western winds prevail in winter), which protects the soil from deep freezing during the winter and which guarantees a sufficient amount of moisture during the summer.

Depressions, which are directed towards the south, are excellently heated by the summer sun. The thawing of snow begins earlier here in spring.

During the summer and fall-spring time such depressions receive a great amount of moisture on account of all kinds of side run-offs.

All the above cited reasons create in these depressions conditions for development of vegetation which are not characteristic of this tundra zone.

On the cited section we encountered a series of vertical belts of vegetation (alpine, sub-alpine and forest). The section proper was surrounded from all sides by mountain-tundra.

Starting from top to bottom we distinguished the following vertical zones of soil:

1) a region of soils of mountainous stony tundra;

2) soils of tundra-sub-alpine region;

3) soils of mountain-forest zone;

4) soils of large-shrub forest tundra at the foot of the slopes;

5) soils of bottomland tundra.

The soils of the tundra-sub-alpine zone and soils of the mountain-forest region are the most interesting from the scientific-theoretical and practical point of view.

Evidently, these soils represent a special modification of sub-alpine and of turf mountain-forest soils, which are found only under conditions which were described by us and therefore require particular and specific approach for their cultivation.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Actually, if the soils of the sub-alpine zone usually have a brownish color, an acid reaction, are in an unsaturated state, then our soils of the tundra-sub-alpine zone have a dark-gray color; the reaction ranges between pH-6 and pH-7. They are almost free from absorbed hydrogen and, especially, aluminum. The unsaturated state rarely exceeds 5-6%. They are very rich in exchange bases and humus (in a ratio of C:N in limits of 10 to 12). The upper horizons of soil have a well expressed fine granular structure. The described soils are covered with luxurious vegetation of sub-alpine variety of grasses, which is alternating with spots of juniper, and sometimes with shrubs (whortleberry, bog bilberry).

In the "mountain-forest" belt we find still more specific soils; they represent a special modification of turf mountain-forest soils.

If in speaking about the "tundra-sub-alpine" soils we told that in them the reaction ranges between pH-6 and 7, then in soils described now it rarely goes beyond 6,5, whereupon the water and salt pH are very close, although the salt is always somewhat lower than the water.

It is possible to say, that in them hydrogen is absent altogether; thus, they are fully saturated with exchange bases. The absolute value of exchange bases is very great, especially in upper horizons, which depends on the wealth of organic substances in a ratio C:N from 14 to 16 in these horizons. The underlying horizons have less humus, [Begin p.491] but even here its amount is considerable. The cited soils are somewhat excessively moist, which shows up in a noticeable formation of peat in the upper part of the horizon and by a weak, unclearly expressed structure. In air-dry samples of these soils we noted an excellently expressed, very stable granular structure.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The upper horizons of the soils, which are being characterized, have a black color and a strong turfiness.

The cited soils are covered with a pine forest, very thinned out, having almost a character of a park with a powerful grass covering. A "run-off" form of trees is very conspicuous. (Beginning at the top almost as a small stick, the trees become thicker towards the bottom, reaching sometimes several girths at the butt end.

As we already noted, all the above cited phenomena depend on the soil-climatic inversion, which, in its turn, is dependent on the configuration of the relief.

Studying very carefully the literature on Extreme North, I came in contact with a series of works (principally, botanical) where there are described analogous phenomena of inversion of plants in various regions.

A. A. Grigor'ev (3) thinks that one should consider such sections in the tundra zone "not only thermic, but also plant cases".

Thus, under conditions of Extreme North, the mountainous forms of relief assist in a sharp manifestation of the influence of the exposition. Here an equally great role belongs to both the solar and the wind exposition (and, may be, the last one plays even a greater role).

The influence of exposition tells on a strong change of climatic conditions, including also the lowering of the level of constant freezing. All this, of course, is also reflected on the vegetation, assisting in its richer and more luxurious development.

A luxurious vegetation, milder, climatic conditions and the peculiarity of moistness is promoting a development of specific soils, which remind of mountain-meadows and turf mountain-forest soils of sub-alpine and mountain-forest zone of more southern latitudes, but with a specific modification, which is, apparently, characteristic of extreme latitudes of the North.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Such sections are of great practical interest, and under conditions of the tundra zone can be the best agricultural lands.

The following serves, as the basis for this conclusion:

1. Compared to soils of bottomland tundra, and even to valleys of northern rivers here are the best soils for agricultural production. To these belong, first of all, the "tundra-sub-alpine" and the "turf mountain-forest" soils, which occupy the greatest areas in similar sections (sometimes up to hundreds of hectares).

2. The presence of the forest and of the luxurious sub-alpine vegetation shows that the micro-climate of the cited sections is far better than that of the bottomland tundra, and for this reason is much more favorable for the development of agricultural (vegetable garden) crops.

We think it is essential to organize experiments on agricultural mastering of such sections (here, probably, it will be necessary to conduct small drainage works, especially for the soils of mountain-forest zones; reduce the forest selectively, not altogether; take into consideration anti-erosion measures) with the view of utilizing very widely in the future the results of this experiment when conducting vegetable raising farming in the Extreme North. [Begin p.492].

Literature

1. Bogatyrev, K. P., Turf mountain-forest soils, as a special geographical form of high-mountain soil-formation, Pochvovedenie, 1947, no. 12.

2. Gorodkov, B. N., Vegetation of the Arctic and of the mountain tundra in USSR. Sb. Rastit. USSR, v. 1, izd. AN USSR, 1938.

3. Grigor'ev, A. A., Subarctic. Izd. AN USSR, 1946.

4. Dranitsyn, D., About some zonal forms of the relief of the Extreme North. Pochvovedenie, 1914, v. 4.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

5. Liverovskii, Ia. A., The tundra soils of the North. Trudy Poliarnoi Komissii, v. 19, 1934.

6. Nikolaeva, M., Shrubby type of vegetation in the southern part of Bol'shogo and Malogo Iamala. Botanicheskii Zhurn. USSR, v. 26, no. 1, 1914.

7. Patrikiev, V. V., Agriculture in Iamalo-Nenetskii national district of Omskaia oblast'. Agricultural utilization of the Extreme North. Raboty II rashirennogo Plenuma Komissii Krainego Severa, 1938.

8. Perfil'ev, I. A., Data about the flora on the isles of Novaia Zemlia and of Kolguev. Arkhangel'sk, 1928.

9. Tikhomirov, B. A. To the origin of the meadow-type vegetation in the Arctic Eurasia. Sb. rabot BIMA, 1946.

10. Turnas, P. A. Utilization of virgin lands and the agrotechinos in Murmanskoi oblast'. Agricultural utilization of the Extreme North. Komissiia Krainego Severa. VASKhNIL, 1940, Moscow.

11. Tulina L. N., About forest vegetation in Anadyrskii krai and its interrelashionship with the tundra. Trudy Arkticheskogo In-ta, v. XI, Geobotanika, 1936.

12. Shelūdiakova, V. A., Vegétation in the basin of the river Indigirka. Sov. botanika, 1938, no. 4-5.

13. Tsyplenkin, E. I., Soil-agricultural researches in the Extreme North, Tr. VIUAA, v. 19, 1937.

14. Khrapal', A. A., About the organization of a proper supply base on the Extreme North. Agricultural utilization of the Extreme North. Raboty II rasshyrennogo Plenuma Komissii Krainego Severa. Sel'khozgiz, M., 1938.

15. Eikhvel'd, I. G., Agricultural science in the Extreme North. Sots. rekonstruktsia sle'skogo khoz-va, 1937, no. 4.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Iakovlev, P. V.

Effektivnost' granulirovannykh udobrenii v usloviiakh krainego severa.

[Effectiveness of granular fertilizers under conditions of the Extreme North].

Sovet. Agron., no.7, pp.62-66.
1952 20 So84

(In Russian)

A 779

The high effectiveness of mineral fertilizers under conditions of the Extreme North has been demonstrated by series of investigations conducted by the experimental network of the Institute of Polar Agriculture, Animal Husbandry and Trade Economy, the Polar Department of the All-Union Institute of Plant Industry, the Division of Agriculture of the State Institute of Experimental Agronomy, the Maryn Selection Station etc.

Extensive adaptation of mineral fertilizers to agricultural production of the Extreme North has, however, been delayed as a result of the remoteness of most kolkhozes from transportation points and, consequently, of the difficulties involved in their import in large quantities (pulverized mineral fertilizers have up to now been applied at the rate of 45--90 kg per ha of active substance).

Academician T. D. Lysenko's suggestion concerning the desirability of utilizing mineral fertilizers in the form of granules and in smaller amounts than the pulverized types is of exceptional importance to agricultural production of the Extreme North.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

For the purpose of testing the effectiveness of granular mineral fertilizers and organo-mineral fertilizers under conditions of the Extreme North, and also of developing methods for their utilization, the Institute of Polar Agriculture, Animal Husbandry and Trade Economy conducted a series of experiments, under our supervision, the results of which are cited below.

Influence of granular superphosphate upon the yield of barley. Experiments to determine the influence of granular superphosphate upon the yield of barley were conducted by the Taimyr Zonal Deer Breeding Station (Potapovo) and the Igar Agricultural Experimental Station on lightly podzolic, argillaceous soil; by the Berezovka Agricultural Experimental Station on podzolic, dust-like argillaceous soil; and by the Kondinsk Base on podzolic, dust-like, sandy loam.

The experimental results cited in table 1 show that granular superphosphate with humus proved more effective than granular superphosphate without organic additives.

Granular superphosphate was especially effective on heavily podzolic soils.

Influence of granular superphosphate upon the yield of potatoes. Regardless of the low yields, with the exception of Turukhansk, obtained in 1950 as a result of the extremely unfavorable weather conditions of that year, experiments with potatoes also showed [p.68] a marked increase in yield derived from application of granular superphosphate and particularly from granular superphosphate with humus, compared to application of pulverized superphosphate. In Igarka granular superphosphate, as compared with the pulverized type, increased the yield by 4.4 centners per ha, and granular superphosphate with humus by 8.2 centners per ha; at Potapovo by 4.0 and 8.2 centners respectively.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 1.

Place of experiment	Barley yield in centners per ha			
	No superphosphate	Granular superphosphate (P_2O_5--7.5 kg/ha		
		No additives	with lime (ashes)	with humus
Taimyr Experimental Station*	122.8	126.7	128.9	132.3
Igarka Experimental Station	12.27	14.49	-	15.78
Kondinsk Base	10.3	15.4	14.9	18.9
Berezovka Experimental Station	3.8	5.6	6.6	8.83

*Yield of green mass.

At the Berezovka Experimental Station granular superphosphate without humus produced an increase in potato yield at the rate of 6.4 per ha, and granular with humus neutralized by lime - 28.6 c per ha, as compared with the pulverized type.

At the Turukhansk Base, application of granular superphosphate with humus (at the rate of 7.5 kg P_2O_5 and 140 kg per ha of humus) ensured a potato yield of 214 centners per ha, or 20.7 centners per ha more, as compared with the pulverized type. The yield of potatoes not fertilized with superphosphate was 172 centners per ha.

Comparative effectiveness of organic fertilizers mixed with pulverized mineral ones and with organo-mineral granular fertilizers. In 1950, the Berezovka, Salekhard and Taimyr experimental stations conducted experiments in the comparative effectiveness of various organic fertilizers separately and mixed (humus) with a complete pulverized mineral fertilizer; their effectiveness was compared also with the effectiveness of humus granulated with a complete mineral fertilizer (table 2).

The experiment of the Berezovka Experimental Station was conducted on a plot which in 1947 had been fertilized with manure at the rate of 60 tons

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

per ha. The 1948 and 1949 plantings had been grain crops.

At Salekhard an experiment was conducted on a plot under intertilled crops which in the last three years had been fertilized with manure in the total amount of 190 tons per ha; the soil was podzolic, dusty clay.

At Potapovo (Taimyr Experimental Station) an experiment was conducted on a recently reclaimed plot. The forerunner of 1948-1949 had been potatoes fertilized with manure at the rate of 20 tons per ha annually.

Experimental results cited in table 2 show that: 1) humus applied in amounts even three times smaller than those of manure produces a large increase in potato yield; 2) organo-mineral granules are more effective than a simple mixture of the same fertilizers.

Because, at the Conference held in January of 1951 at the All-Union Lenin Academy of Agricultural Sciences imeni V. I. Lenin [p. 64] on the use of granular fertilizers, an opinion was expressed concerning the desirability of utilizing a plain mixture of organo-mineral fertilizers instead of granular fertilizers of the same type, we in 1951 repeated this experiment under conditions of the Berezovka Agricultural Experimental Station.

The experiment was conducted on podzolic, dusty clay soil characterized by the following data (of arable layer 0--20 cm): pH of water extraction 4.41, of salt 3.90. hydrolytic acidity 7.35 m. equiv. [ekv.] per 100 gr of soil, total absorbed substances 7.14, saturation with substances 49.23%, absorption capacity 14.49 and exchange acidity 8.09*.

The plot on which the experiment was conducted had been reclaimed from under forest cinders [gar'] in 1938 and had been utilized in agriculture ever since. In 1949 the plot was used under fallow and in 1950 it was seeded to oats.

* Analyses were made by the analysts F. A. Lebedeva, K. P. Nikitina and G. A. Liutsernova.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Organic fertilizers were applied evenly to the entire experimental plot. Mineral fertilizers - ammonium nitrate, superphosphate and potassium salt - were applied individually as well as mixed with humus and in the form of organo-mineral granules at the rate of 15 kg per ha of active substance.

The area of the test plot was 105 square m, and replication was triplicate. The experimental crop was the potato (Aziia-B variety) vernalized by exposure to light for 44 days. [Begin p. 65]. The weight of seed tubers fluctuated between 60--80 gr.

Mineral and organo-mineral fertilizers were applied to hills in a preliminarily rolled out and marked field on June 6th; the hills were arranged at 30 x 60 cm. intervals. The potatoes were planted on June 7th. Tending potatoes included triple hilling: June 26, July 19 and August 7, with subsequent harrowing [rykhlenie] and arrangement of hills [greben'] and vines. The first appearance of sprouts was noted June 19, and full appearance June 26. Harvesting took place September 21st.

The potato yield on the control plot was 203.8 centners per ha, upon application of NPK - 286.7 centners, upon application of organo-mineral fertilizers - 290 centners, and upon application of organo-mineral granular fertilizers - 339 centners per ha.

Experimental results show that the use of fertilizers on podzolic, dusty clay soils increases considerably the yield of potatoes. Application of NPK at the rate of 15 kg per ha active substance increases potato yield by 36%, yet the same amount of NPK mixed with humus increased the yield by 42%, granular mineral fertilizers (NPK) with humus - by 66%. Experiments have demonstrated the advantage of utilizing organo-mineral fertilizers in the form of granules, as compared with the application of a plain mixture.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 2.

Name of experimental stations	Experimental variation	Potato yield in c/ha	Marketable tubers in %	Starch content in %
Berezovka	No fertilizers	32.8	22.5	14.0
	Manure 30 tons/ha	39.4	27.6	14.0
	Humus 30 tons/ha	66.9	37.7	16.0
	Humus 30 t/ha + $N_{20}P_{30}K_{30}$	135.8	59.1	14.0
	Humus 10 tons/ha	47.9	26.9	15.0
	Humus 10 t/ha + $N_{20}P_{30}K_{30}$	104.2	52.6	15.0
	Humus 9 t/ha + 1 t/ha humus granulated with $N_{20}P_{30}K_{30}$	144.0	64.9	18.0
Salekhard	Manure 30 tons per ha	141.3	82.0	12.2
	Humus 30 tons per ha	134.2	76.0	12.2
	Humus 30 t/ha + $N_{20}P_{30}K_{30}$	166.0	83.0	11.7
	Humus 10 t/ha	134.4	80.0	11.6
	Humus 10 t/ha + $N_{20}P_{30}K_{30}$	170.7	86.0	10.6
	Humus 9 t/ha + 1 t/ha humus granulated with $N_{20}P_{30}K_{30}$	160.4	83.0	12.2
Taimyr	Manure 30 t/ha	38.1	34.7	-
	Humus 30 t/ha	49.7	46.2	-
	Humus 30 t/ha + $N_{20}P_{30}K_{30}$	71.8	66.7	-
	Humus 10 t/ha	46.7	42.9	-
	Humus 10 t/ha + $N_{20}P_{30}K_{30}$	62.2	47.9	-
	Humus 9 t/ha + t/ha humus granulated with $N_{20}P_{30}K_{30}$	69.9	55.7	-

Influence of size of granules upon yield of potatoes. Experiments to determine the influence of various sizes of superphosphate granules upon the yield of potatoes were conducted at the Igarka Experimental Station and at the Turukhansk and Khanty-Mansiisk Bases.

The experiemtnal results (table 3) demonstrated that granular superphosphate is considerably more effective than pulverized superphosphate. In most cases an increase in effectiveness is observed as the size of granules is increased.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 3.

Experimental variation	Potato yield in c/ha			
	Turukhansk base P_2O_5 15 kg/ha (in furrow)	Igarka Experimental Station		Khanty-Mansiisk experimental station P_2O_5 15 kg/ha
		P_2O_5 7.5 kg/ha (in hills)	P_2O_5 15 kg/ha	
No superphosphate	175.7	172.2	60.8	166
Pulverized superphosphate	190.0	193.6	79.6	223
Granular superphosphate:				
0.5--1.1 mm	203.3	208.2	89.0	225
1.0--3.0 "	229.4	195.9	91.8	206
3.0--5.0 "	208.9	214.3	89.0	220
5.0--7.0 "	200.6	212.4	98.6	236

Influence of application methods for granular superphosphate upon the yield of barley. Experiment was conducted at the Igarka Agricultural Experimental Station (M.N. Goncharin) on the "Poliarnyi" sovkhoz. The soil was a slightly podzolic clay and the forerunner had been the turnip. The plot had not been fertilized in the last three years. In the spring of the experimental year potassium chloride was applied at the rate of 30 kg per ha active substance under the harrow after the soil had been plowed. Superphosphate that had preliminarily been neutralized with lime, in the amount of 5% of the fertilizer weight, was applied on June 11-13. Granules used in the experiment were 3-5 mm large.

Scheme and experimental results are cited in table 4.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 4.

Experimental variation	Methods of fertilizer application	Dose of P_2O_5 in kg/ha	Barley yield in c/ha
No superphosphate	--	--	12.3
Pulverized superphosphate	Before seeding under harrow	30	12.9
Granular superphosphate	Same	15	13.0
Granular superphosphate	At time of seeding	15	14.9
Granular superphosphate	Same	7.5	14.5
Superphosphate granulated with humus	"	7.5	15.8

The data cited in table 4 have demonstrated that pulverized superphosphate is less effective than granular. The experiment has revealed the advantage of applying neutralized granular superphosphate together with barley seed. According to experimental results, the dose of granular superphosphate can be considerably reduced, if it is applied by this method.

Application of granular superphosphate at the rate of 7.5 kg per ha P_2O_5 together with barley seed produced the same effect as its application at the rate of 15 kg per ha P_2O_5. The experiment has confirmed the advantage of applying superphosphate granulated with humus.

CONCLUSIONS

1. Granular superphosphate, as well as the pulverized type, exerts a positive influence upon the productivity of agricultural crops on all soils of the Extreme North.

2. A much higher effect is obtained when superphosphate is applied in the form of granules.

The greatest increase in the productivity of agricultural crops was ensured by the application of superphosphate granulated with humus.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

3. The effectiveness of granular superphosphate grows as the size of the granules is increased (the maximum dimensions of the granules used in the experiment were 7 mm).

4. On podzolic soils a positive influence is exerted by neutralizing superphosphate with lime.

5. The effectiveness of granular superphosphate neutralized with lime increases when it is applied together with the seed (potato, barley).

Beregovskaia Sel'skokhoziaistvennaia
Opytnaia Stantsiia.

* * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Tiurdenev, A.

25 let raboty poliarnoi opytnoi stantsii.

[Tenty five years of work of the Polar Experimental Station].

Sad i Ogorod, no. 11, pp. 65-67, 1948 80 Sa15

(In Russian)

On the occasion of the 25th anniversary of the Polar Experimental Station at Khibiny, the author traces its history from the year 1923 when Academician I. G. Eikhfeld, then a young agronomist, organized a more base on the shore of Lake Imandra on the Kola Peninsula.

A 780

The colonization expedition of the Murmansk railway which arrived there in 1923-24 found no tilled land whatever, yet by 1926 14 varieties of vegetables and potatoes were grown there. The Station refuted the theory of Czarist times that agriculture was not feasible in the far north. The author quotes passages from Academian Eikhfeld's picturesque description of a land where Karelia and Leningrad were considered the "South".

In 1929 the Station was instrumental in organizing the forest sovkhoz named "Industriia". By 1940 they had 1,700 hectares planted to various vegetable crops, and their important nursery and livestock enterprises were thriving. In less than 10 years they had invaded the tundra and were developing agriculture in Agarka, Kolyma, Vorkuta, Norilsk, Nar'ian-Mar, Salekhard, Verkhoiansk, Kamchatka etc. In the European part of the USSR agriculture had reached 68-69° north latitude, in Asia 69-70 and 72° latitude. Mineral soils were fertilized with organic substances, swamps

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

were drained, and peat bog was saturated with mineral fertilizers; when the necessity arose, soils were infected with bacterial flora.

The station had to solve many other problems: some perennial root crops turned into annuals in the North, they flowered, but failed to produce a normal root; some self-pollinating plants were transformed into cross-pollinating ones. The Station was producing considerable amounts of barley and oats on the Kola Peninsula at the Khibiny latitude as early as 1930. Winter rye and even early-ripening spring wheat reached maturity on mineral soils. The area of mineral soils was small and so methods had to be devised for the adaptation of bog soils. Soon the agrotechnical methods developed permitted cultivation of crops on peat and mineral soils. Some of the plants adapted to northern conditions were imported from Africa and southern Asia.

In 1932-1938 the Station entered upon a new phase of work. It needed crops with a high degree of productivity, resistance and normal development. Basing its work on Michurin's theory of changing the nature of the living organism and on Lysenko's theory of phasic development, it brought out 27 varieties of 12 vegetable crops by selection, concentrated crossing, hybridization and directed rearing. New potato varieties developed in recent years are cited in the following table.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Productivity and starch of best potato varieties and seedlings
Khibiny, 1941--1947

Name of variety	Number of days of vegetation	Average yield		Maximum yields (in c/ha)	Starch content (in %)	
		in c/ha	in % of standard		Average	Maximum
Sneshinka	108	167	100	528	12:9	15:2
Imandra	105	176	105	547	14:0	17:1
Vermont	91	163	98	516	13:2	15:2
Paul'-Wagner	110	174	104	527	13:4	16:4
210/78	96	167	100	565	12:6	14:7
156/72	108	185	109	534	12:1	14:5
11/185	106	180	108	532	14:2	16:7
Ustbes	110	184	109	540	13.0	14.4

The Polar Station has investigated 585 specimens of cultivated varieties and of wild forms of berry plants, and by 1947 it had turned over 64,550 specimens of various berry plants to production.

The achievements of the Station are an excellent affirmation of the Michurin-Timiriazev-Vil'iams-Lysenko teaching concerning the influence of environment and conditions of life upon plant organisms.

* * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Tiurdenev, A. P.

Semenovodstvo ovoshchnykh kul'tur i kartofelia na Krainem Severe.

[Seed production of vegetable crops and potatoes in the Extreme North].

Sad i Ogorod, no. 8, pp. 67-69.
Aug. 1948. 80 Sal3

(In Russian)

Until recent times the districts of the Extreme North satisfied the demand for seed by importing them from southern districts. This made vegetable production of the northern districts dependent on timely import, and, apart from this, the seeds of plants produced in the south were less resistant to severe northern conditions and, consequently, less productive than seed of the same varieties produced locally. It is known that the quality of seed can be improved by the simple method of mass or individual improvement selection, especially if concentrated crossings take place when the crops are cultivated on a high agrotechnical background.

Tests made of varieties of diverse origin at the Polar Experimental Station (Khibiny 67°44' of northern latitude) for a number of years produced the following results:

A 781

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Crop, variety and place of seed production	Number of years tested	YIELD		
		Average (in c/ha)	in % of Standard	Maximum (in c/ha)
Cabbage Number One - 147 (Gribovo b	11	427	100	840
" " " - K-206 (Khibiny	11	480	112	931
Cabbage Val'vat' evskaia - 145 (Gribovo)	11	309	100	492
Cabbage Val'vat'evskaia - K-220 (Khibiny)	11	365	118	536
Rutabaga Krasnosel'skaia (Pushkino)	5	221	100	291
" " (Khibiny)	5	320	145	386
Turnip Osterzundomskii (Pushkino)	5	204	100	261
" " (Khibiny)	5	358	176	502

Analogous data concerning the advantages of seed of local selection and production were obtained at the Nar'ian-Mar'sk Experimental Station (Arkhangel Oblast) for white-head [belokochannaia] cabbage Number One and for turnips [Brassica rapa], in experiments conducted at the Igarka Experimental Station, the Khanty-Mansiisk, Tartsevo and other bases of the Extreme North.

Organizing seed production of their own in the districts of the Extreme North will facilitate the further movement of vegetable and potato production northward.

One of the basic problems in organizing seed production is the selection of variety. In the Extreme North the early-ripening varieties are more valuable. Late varieties, especially in polar districts, produce either no marketable yield, or yield a low percentage of marketable crops.

The beginning of variety study and of the development of seed production problems in the Extreme North was laid by the Khibiny Polar Experimental Station on the Kola [Kol'skii] Peninsula in the year 1928. Since 1932, as many as 20 experimental institutions of the North have joined

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

in this work, as the scientific-research network developed. A large number of varieties of vegetable crops and potatoes were tested in the past 25 years. The Polar Experimental Station alone has investigated over 4 thousand variety specimens derived from 22 crops. The Station has isolated, improved and developed 27 varieties of 12 vegetable crops and over ten varieties of potatoes.

Improtant work in testing and selecting varieties of vegetable crops and potatoes is conducted by the network of bases of the Institute of Polar Agriculture. [Begin p.58]

Many polar districts of the Yamalo-Nenets national district have already uniform crops of varietal potatoes.

The inhabitants of a number of localities have long since been growing their own seed of turnips, onions and other vegetable crops (for instance, in the Pechora River area - the Neritskaia turnip, Pizhemskii onion etc.).

During the Patriotic War many northern sovkhozes and kolkhozes provided themselves with a partial, and some with a complete supply of seed of their own production. For example, the "Novyi Bor" sovkhoz, Ust-Tsilma District, Komi Autonomous SSR, produced in the last [war] years tons of seed of vegetable root crops and turnips.

In 1945, kolkhozes and experimental stations on Kamchatka produced 1,156 kg of seed of various crops, including: 92 kg of cabbage, 30 kg of beets, 323 kg of turnips, 50 kg of rutabaga, 100 kg of radishes, 3 kg of carrots and 557 kg of turnips. The local demand for some of these crops was fully supplied and part of the seeds was shipped beyond the borders of the oblast.

In the years of the Patriotic War and through 1947, the Polar Experimental Station (at Khibiny) produced 1,443 kg of seed of various vegetable crops.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

These examples demonstrate that agricultural workers of the Extreme North are accomplishing successfully the transition to growing uniform, varietal crops, as decreed by the February [1948] Plenum of the Central Committee of the VKP (b) [All-Union Kommunist Party (of bolsheviks)].

By now the problem of adapting the seed of certain crops to certain districts has also been solved. According to the degree of crop requirementswith regard to natural conditions, the Extreme North can be divided into three zones. An assortment of crops and the appropriate agrotechnics, ensuring accelerated ripening of seed, have been developed for each of these zones.

The first zone - tundra districts and the northern part of forest-tundra (65--69° of northern latitude), vegetative period (at temperatures above 5° C) from 75 to 110 days. Here the seed of turnips [Brassica rapa], of turnips [Brassica campestris rapifera] and of the onion [luk-batun] can be grown in open ground. The seed of cabbage, of radishes [Raphanus], rutabaga, and radishes [Raphanus sativus], can be grown only in covered ground.

Second zone - southern part of the forest-tundra and northern part of the forest districts (62--65° of northern latitude) with a vegetative period of 90--120 days. In this zone the seed of all vegetable crops of the first zone can be grown in open ground. For the purpose of accelerating ripening and producing full-value seed, it is absolutely necessary that rutabaga and the radishes Raphanus and Raphanus sativus be allowed to grow for awhile (15-20 days) [in nursery], cabbage and kohlrabi (30--40 day), [in nursery] before they are transplanted into open ground.

Third zone - the rest of the taiga [Siberian forest] (58--62° of northern latitude) with a vegetative period of 110--135 days. In addition

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

to the crops indicated above, it is possible to grow beet and carrot seed in open ground, provided that the latter are allowed to grow [in nursery] 30--40 days and are given a chance to mature after their harvest.

Advance growing is conducted in enclosed ground, in nurseries, hot-houses or other installations at a 10-12° temperature.

The required agro-method used in all zones to accelerate ripening of seed is the removal of late shoots, leaving no more than 7--10 shoots on a shrub, and nipping the tops of the flower shoots.

In February of the current year, the 8th enlarged Plenum of the Commission for the Extreme North of the All-Union Academy of Agricultural Sciences (VASKHNIL) approved variety regionalizing developed by the Administration of the Extreme North of the Ministry of Agriculture, RSFSR, on the basis of results obtained by the experimental network of the Institute for Polar Agriculture, by other experimental institutions and commercial experiments of sovkhozes and kolkhozes.

Crops recommended for this project are: of cabbage, the basic variety for all districts of the Extreme North is Number One - 147, and number K-206 for the European North, additional varieties for the forest districts being Copenhagen [Kopengagenskaia], [Begin p.69] Val'bat'evskaia and Slava; the basic carrot variety for all districts of the Extreme North is Nantskaia-04, and additional ones are Shantene, Rannii Khorn, and Karotel' of Khibiny selection; of beets, the basic variety for the tundra and forest-tundra districts is Egipetskaia ploskaia, and for the forest districts - Bordo; prospective varieties are Karmazinovyi shar K-250 and Egipetskaia K-249; of rutabaga for all districts of the Extreme North - the Krasnosil'skaia variety; of turnips [Brassica rapa] - Petrovskaia; of potatoes - varieties of the Kur'er group.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

In addition, the potato variety Imandra is recommended for the Kola peninsula, and for the tundra and forest-tundra districts of the Yenisei North - Seianets-101, for the southern districts - Berlichingen [Berlikhingen]. The beginning of systematic seed production in the North was laid in 1948.

The time left before the yield is harvested must be utilized for the preparation of appropriate storage conditions for the seed plants [matochnikov] of vegetable crops and for the implementation of mass improvement-selection. Criteria in cabbage selection must be early-ripening, good, solid heads, varietal type, productivity, and immunity to diseases; specimens selected for root crops must be healthy ones, without second gorwths, typical of the variety, well formed and productive.

At the end of August and at beginning of September seed plots and variety potato plantings must definitely be cleared of varietal admixtures and of visibly sick and retarded vines, and vine by vine selection of powerful, well developed and productive vines giving higher yields must be organized.

Further, the best specimens according to the yield of a hill, are selected from the best isolated vines, then the selection of tubers is carried out; i.e. selection of the best tubers from the best vines and hills. Seed material thus selected must be stored separately by kolkhozes and sovkhozes. Variety seed must also be stored separately.

* * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Trans. A-782
(Abstract)
vg/M

Eikhfel'd, I. G.

Sozdanie prodovol'stvennoi bazy na Krainem Severe.

[Establishing a supply base on Extreme North].

Akad. Sel'sk. Khoz. Nauk im. V. I. Lenina. Doklady no. 1. p.5-8. 1944. 20 Akl

(In Russian)

The problem of development of farming on the wide zone of the Extreme North in the Soviet Union, which constitutes over 40% of the whole territory of our country, was first brought up in government plans in 1931. A comparatively wide scientific-research organization in this field was started at the same time, if one does not count the small research work which began before the World War on Pechora and the work in 1925, done already under the Soviets, in Khibiny, on Kol'skii peninsula.

This last work, scientific and practical, was conducted fully during the time of Soviets, and, principally, during Stalin's last two five-year plans.

As it turned out the nature of the Extreme North is much more favorable to the development of farming than it was previously supposed.

Agricultural science, which bases itself on works of such outstanding scientists as K. A. Timiriazev, I. V. Michurin and V. R. Vil'iams, quickly found ways to alter the nature of cultivated plants in conformance with conditions in the Extreme North.

It is a known fact, that, when moving from south to north, the direct radiation of the sun decreases but this loss is compensated by a rising

A 782

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

dispersed radiation. Thanks to an extreme transparency of the air in the circumpolar region, the total sum of radiation in the North during summer is equal to that in the South.

The second positive factor is a longer continuance of sunlight in northern latitudes during summer months.

Already on the latitude of Khibin, that is on 67-68° north latitude, in the course of a month and a half there is practically no night.

V. I. Razumov, of the Khibiny Arctic Experiment Station, showed through his research that many plants utilize reduced sunshine during the "night" hours.

It seems that in the carbohydrate balance, the night hours, during the middle of summer, do not play a great role. Nevertheless, when the night lighting is added to the day, it allows the plant to develop faster and also to increase considerably the yield of the organic mass.

Thus, the importance of the night hours for the speeding up of growth, and, consequently, of ripening is exceptionally large. If a plant is isolated from daylight and receives the light only during the night, its growth proceeds in a normal tempo, although the increase of mass is small. The grain plants, for instance, which were given only night light came to the heading stage simultaneously with those vegetating in full daylight.

The continuous sunlight on the Extreme North during the summer months is also lengthening the frostless period because the temperature of the air during sunlight very rarely drops below zero.

In the North the composition of light is also favorable to the fast development of plants. With a low standing of the sun on the Extreme North the long-wave part of the spectrum (particularly, the orange) is strengthened and this promotes quick ripening.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Besides this, the temperature of the soil during the spring period is favorable to the stage of vernalization. That is the reason why many grain plants ripen in the North in shorter periods during lower temperatures, when in more southern latitudes, they do not even enter into the phase of ripening. The influence of these factors is so great that some southern samples of spring wheat and of barley ripen in Khibiny faster than on Kuban'. This was ascertained from parallel plantings of the same samples in both north and south.

Under the influence of natural conditions of the circumpolar zone, some plants not only change their usual course of developement, but also their most conservative characteristics; vegetable root crops change from biennial to annual, winter grains become spring, and so on. More than that, certain groups of plants loose even their basic systematic features. The changes which occur one generation after another do not conform to the idea of many scientists about the form of inheritance of so-called dominant and recessive characteristics. For instance, as a result of cultivation of [illegible] some samples of barley in Khibiny for several years, they produced a large number of variegated, and often quite sharp changes in their outward characteristics. Often in one and the same plant, or even in one and the same spike, one found bearded and beardless seeds, some with two rows or with many rows, some gymnospermous, and so on. The cause of these changes was the sudden shift to uncommon environment.

Our problem was to utilize these phenomena and develop varieties which would be early-ripening and not exacting to heat; such varieties which would give satisfactory yields during the short and cold summer.

The fact that in the North nature breaks up the usual course of the plant's development is very important to a selector.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The process of acclimatization of plants to the changed conditions proceeds even without man's interference. The characteristic of early-ripeness progressed in the grains after several years of cultivation even without the selection of more early-ripening forms.

And yet with the process of selection the changes proceed much faster, especially for such crosspollinating plants as vegetable crops, as well as for potatoes, where we used the clone selection.

As the experimental work in Khibiny has shown one can achieve for vegetable crops, by means of mass and family selection, during the course of one or two generation, not only a sharp increase in early-ripeness, but also of yields, about 25-30% higher, compared to the initial sample. By methods of selection and of cultivation, under certain agrotechnical conditions, one can quickly increase the early-ripeness and yields of vegetable crops, as well as increase their resistance to diseases and pests. These facts lead to the importance of organization of seed growing, or at least to growing of elite seeds in the same region where later commercial sowings will be conducted.

By a method of interbreeding the varieties of barley, of wheat, and of oats, we succeeded, in Khibiny, to increase their yielding capacities, and in some case the early-ripeness also.

With intervariety crossbreedings, when selecting pairs according to positive reaction to natural factors, we obtained still greater increase in the yielding capacity, as well as in early-ripeness.

The speed of passage by parent forms of stages of vernalization and of the luminous under conditions of the North, where the temperature of the second half of summer is very low (8-12°) does not always determine a success. In selection for early-ripeness the deciding factor is the ability

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

of even one of the parents to tolerate low temperatures during the period of formation of tubers, of seeds, and so on. We were convinced of this mater during our experiments of selection of oats and potatoes.

Several high-yielding, early-ripening varieties of potatoes were developed in Khibiny by means of interspecies crossings, and they already have received a wide spreading. By crossing with the selected variety, a variety, which starts the tuber formation at a lower temperature than the others, we obtained hybrids, which are less demanding to heat, and, consequently, are more early-ripening and better yielding.

Some interesting results were obtained in Khibiny during sex and vegetative hybridization of tomatoes. Some hybrids, growing in the open ground with an average temperature of 10-12° during the vegetative period, yielded up to 30% of red fruits.

Besides the development of early-ripening varieties, and the utilization of the vernalization method or any other means of preplanting preparations of the seed material, there are still other procedures which can help in moving the crops further to the North. One of them is a lengthening of the vegetation period by means of premature thawing of snow. On the Kamchatka Experiment Station they succeeded in removing the snow by water and earth, and began their field works two weeks earlier than usual. On the Poliarnaia Experiment Station, on Kol'skii peninsula, when they removed the snow earlier with the aid of pulverized nepheline rock, which at the same time served as a potassium fertilizer, they conducted an early planting and had the grain crops ripening advanced by 8 days, as also an earlier ripening of timothy seeds.

As a result of the experimental work, many regions now have their own early-ripening varieties of potatoes and improved varieties of vegetables. The more southern regions of the Extreme North have their own varieties of

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

grain crops which ripen in 70-75 days at low temperatures.

The soil conditions in the Extreme North are heterogeneous. In the more southern regions, on the 60-65° of northern latitude, in the lowlands of large rivers there are lands which are very fertile and after being brought under cultivation can give for a few years good yields of grain crops without any additional fertilizers, or with a very limited amount of them.

In the zone of tundra and forest-tundra the soil conditions are less favorable for agriculture. The, so-called, mineral soils are poor in organic matter and in basic food elements for plants; the microbiological processes are also very weakly developed in these soils.

The soil, from the agricultural point of view, must be artificially developed by means of introducing large amounts of organic substances: during the first years of utilization up to 100 t of peat-manure or of 50-70 t of peat-fecal composts. But these soils, with the exception of semi-bogs, or lowlands, do not contain any harmful matter for the plants, which would hamper a fast cultivation of the land.

In Murmanskaia oblast' after the proper system of fertilization, it was possible to form a plowing layer of soil about 20 cm deep and to obtain in the first year more than 200 c of potatoes per ha and up to 70 c of hay from annual grasses.

When mineral fertilizers are used on drained lowland bogs in the North especially high yields were obtained: up to 500 c of cabbage, 50-60 c of hay per ha.

The fields in the North need higher agrotechnics than the South.

For the last 15-16 years the planted areas in the North increased more than 7 times. The so-called "northern limit for agriculture" has now disappeared. Potatoes and vegetables are now cultivated in many localities

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

in the region of the 70° of northern latitude, and the grain crops of the 68°.

On the well known arctic Diksen island hothouse cultivation is developing successfully and even some animal husbandry. On Tiksi bay, of the Lena river, vegetables are grown not only in hothouses, but in the open ground. On Taimyrskii peninsula in Dudinka and in Noril'sk they grow not only cabbage and turnips but also potatoes, carrots and beets.

In the industrial zone of the North, on Kol'skii peninsula, and in regions around, agriculture already achieved considerable size and many needs of the population are met by local production. Animal husbandry is developing also.

The Arctic Experiment Station of the All-Union Institute of Plant Growing on Kol'skii peninsula developed many new varieties of early-ripening varieties of potatoes, of vegetables, of grains and fodder, and even of berry crops. This station was the first to develop methods for transforming swampy northern marshes and forest lands into fertile lands, meadows and pastures; they also worked out the basis for agrotechnics so as to obtain high yields. Many other experiment stations of the North are working on these problems too.

To give a few examples of results, the station in Khibiny obtained 300 c per ha of potatoes, up to 600 c of cabbage on drained bogs; 25 c of grains of early-ripening oats and barley; 50-60 c of hay from sown grasses. Of late, they even have tomatoes, which ripen in open ground. Another station, situated on the latitude of the polar circle, also obtains large yields of vegetables and potatoes, and in a hothouse they get 21 kg of cucumbers from each sq. m.

Animal husbandry is also being developed very successfully. On well

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

organized farms a milch cow, kept on pasture, gives up to 3000 l of milk and the record-holders up to 5000 l.

Foraging resources in the North allow a still greater development in animal husbandry. Also a large amount of valuable concentrates could be produced by the fish industry, if the fish wastes, which are now discarded would be reprocessed and used for cattle fattening.

Although, during the war years, the lands that are newly brought under cultivation can give good crops without any additional fertilizing, this should not be practiced longer than 2-3 years. In the North special attention should be given to manure. Without it one cannot obtain there satisfactory results. It is necessary to triple or even quadruple the stocks of organic fertilizers by means of composting peat with manure, with manure water, or feces.

As, during war time, machines and tools for clearing the virgin lands are hard to obtain one should make good use of the rail-harrow or the Canadian harrow. These can be produced by the machine-tractor stations locally with metallic parts, obtained from factories.

As, during the winter and early spring-time, it is very hard to supply the cities of the Extreme North with fresh vegetables, this problem can be solved by growing vegetables during summer in open ground and storing them in special ice isothermal storages. These are good all year round for keeping, besides vegetables, fresh berries, milk products, fish, and so on.

Thus, in order to establish a supply base in the Extreme North, the problems are:

1. To increase food supplies by a wide development of potato and vegetable plantings in individual and collective vegetable gardens of the working people.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

2. To widen the plantings of grain crops; winter crops, in the first place, by means of utilizing fertile virgin lands along the valleys of Ob' and Enisei rivers, and lands cleared from deciduous forests in Narymskii region.

3. To increase the number of domestic animals by utilizing natural foraging resources, and, particularly, the areas in river valleys, as also the wastes of the fish industry.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Ms. A.-783
(in full)
vg/M

Danilin, A. I.

Izmerenie vlazhnosti pochvy pri pomoshchi gamma-luchei.

[Soil moisture measurement by means of gamma rays].

Pochvovedenie, no. 7, p.74-83.
July 1955 57.8 P34

(In Russian)

Study of the moisture condition of soils and lands and its control is the most important factor in the work for increasing agricultural production.

Data of instrumental observations of soil moisture, obtained on numerous agrometeorological and experiment stations, in kolkhozes and sovkhozes, are the primary materials for surveys of the water condition of soils and lands, as well as for the operative hydrometeorological servicing of agriculture.

As it is known, the most widespread method for measuring the moisture content of the soil is the heating, or weighing method, based on the determination of the amount of water in the soil by means of weighing the samples of soils when they are moist or dried. This method is very laborious and gives sufficiently accurate data about the moisture content of the soil under a condition, that the samples be taken from one or another depth in more than four replications.

The lengthy drying of soil samples in the oven and the painstaking work of their weighing does not permit one to obtain data about the moisture content of the soil under field conditions.

Besides this, measuring the moisture content by this method is coupled with disruption of the structure of the soil. The matter of finding a

A 783

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

reliable and efficacious method, which will permit one to conduct a measurement of the moisture content, under field conditions, without taking out samples from the soil, and without breaking up the soil's structure, is of great importance.

The methods and apparatuses, which will permit one to measure the moisture content of the soil without removing samples of it from the soil, are:

1. electrical methods, based on the measurement of electrical conductivity or of resistance of the soil, depending on its moisture content (by resistance of electrolytic films of glass fibres and various ceramic and gypsum materials, which are introduced into the moist soil medium) or based on a measurement of the electromotive force of a galvanic pair of electrodes, inserted into the soil;

2. dielectric method;

3. thermic methods in which the following serve as a criterion of the moisture content: thermal conductivity, thermal capacity, temperature conductivity or a combination of thermic factors (A.F. Chudnovskii's criterion);

4. a method for measuring the moisture content of the soil by an "absorptive power" of the soil;

5. radioactive methods: neutron method, based on the property of hydrogencontaining mediums to inhibit the fast neutrons, transforming them into slow ones (thermal), and a new gamma method, based on measuring the reduction of gamma rays during their passage through the soil.

From among these methods the gamma method and the neutron method give the greatest promise.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Heterogeneity of the composition of soils and grounds, their distinct condensation, as well as a difference in capillary and hygroscopic properties condition a dissimilar infiltration of rainfall and of thawed waters into the soil, as well as a different ascent of ground waters. This is what causes an uneven distribution [Begin p.75] of moisture in the soil. In view of this all the known methods and apparatuses allow one to measure the moisture of the soil (with a certain degree of accuracy) only in localized points on various depths. These local measurements of the moisture content of the soil can be, in many cases, haphazard and not characteristic of a layer of the soil. As it is known, on agrometstations, in order to obtain more accurate data about the moisture content of the soil, a fourfold replication for taking samples from a certain depth has been adapted. Yet, as many observations of the moisture content of the soil by this method have shown, variations in the amount of moisture of individual samples of soil from the mean value among four observations sometimes reach 10% and more.

The following data on observation of moisture content in the soil can serve as an illustration for the above; the observations were conducted on agrometstations during spring-summer and the autumn periods of 1953 on sections under oats, sown in 1953; under winter rye, sown in 1952; under clover, planted in 1951, and winter wheat, planted in 1952 (table 1).

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Name of the agrometstation	Number of observations of the moisture content in the soil	From these a number of cases which have variations from the mean moisture content in the soil, in %						Highest variations in % from the average moisture content
		<1	1-2	2-3	3-4	4-5	>5	
Torzhok, Kalininskoi obl.	389	163	116	53	26	16	16	12.3
Shokino, Smolenskoi obl.	398	205	107	42	16	12	6	12.5
Mikhailov, Riazanskoi obl.	346	229	85	21	9	4	-	4.6
Tuma, Riazanskoi oblast'	384	191	92	53	22	14	12	9.7
Total	1517	798	397	169	73	46	34	-

The average quadratic and probable error, s which were calculated from 37-40 observations by these stations on the moisture content in the soil on Δ one and the same depth, have values from 0.61 to 2.2.

The cited data about the accuracy of measurements of the moisture content in the soil by a method of drying and weighing the samples, show that by this method the moisture content can be determined with a precision of not more than 1.5-3% under a condition that the samples will be taken in a number of not more than four.

It is pertinent to note, that with other methods are compared with all this absolute method of measuring the moisture content in the soil, and the evaluation of the precision of measurements is given on the basis of inaccurate control measurings (on the strength of the uneven distribution of moisture in the soil), which are conducted with the aid of thermostatic drying. Hence, if the "thermostatic" is the controlling method, then one cannot demand greater requirements in accuracy from all the new apparatus and methods of measuring, than from those obtained with the aid of the absolute "thermostatic" method.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Considering that the problem of measuring the moisture content in the soil, without disturbing the soil medium, is far from being solved, we made an attempt and conducted experimental researches on measuring this value with the aid of gamma rays.

To solve this problem we paid attention to the following considerations:

gamma rays are reduced when they pass through any medium. The rate of reduction of these rays depends on their energy, as well as on the thickness and density of the gamma rayed material. If one assumes, that a dry layer of soil, through which the gamma rays pass, will reduce them to a constant, then an additional reduction of gamma rays, when [Begin p.76] observing geometry and the conditions of measuring, will be caused by water, which enters the soil in one or another way.

With the aid of gamma-rays, the measurement of the water content can be done in any of the layers of soil; that is, one can obtain an integral value of moisture for that certain layer, which is especially important for agriculture.

The gamma method permits one to obtain measurements of the moisture content in the soil without disturbing its natural structure without taking out any samples from the soil.

This method can, very considerably, facilitate the work of the observers, of the moisture content in the soil and free them from the frequent taking of soil samples with the aid of a soil drill, from drying and weighing them, as well as from the calculation work.

It permits one to obtain the value of the soil's moisture content directly of the water layer in millimeters and centimeters, which makes this method more operative.

The accuracy of measurement of the soil's moisture content by the

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

This coefficient has a dimension of cm^2/g, and characterizes a reduction of gamma rays by the layer, which contains 1g of substance for each square centimeter. It does not depend on the state of aggregation of the substance, which is especially important for the measuring of the soil's moisture content, taking into account that the soil can be mellow, packed, and so on.

Sometimes one makes use of the atomic or electronic coefficient of reduction of gamma rays u_a, u_e, which characterize the absorption of gamma rays pertaining to one atom or electron. Reduction of gamma rays by the substance through which it passes is a complicated process, and is conditioned by three factors:

a) by a photoelectric effect = τ;
b) by Compton's scattering = σ;
c) by formation of pairs (electron, positron) = $\varkappa$, that is $\mu = \tau + \sigma + \varkappa$.

[Begin p.77]

Isotope $_{27}Co^{60}$, which has a period half-life of 6.8 years and which gives comparatively uniform gamma radiation with an average energy of 1.25 MeV has been used as the radioactive source. Being an inexpensive radioactive source the isotope $_{27}Co^{60}$ proved to be the most suitable for measuring the soil's moisture content. The activity of radioactive preparations, which were utilized in experiments, was 10.6mC and 0.8mC. Reduction of gamma rays, with an energy of 1.33 and 1.17 MeV, which were radiated by the radioactive cobalt ($_{27}Co^{60}$), is chiefly conditioned in the soil by Compton-effect, which consists of an interaction of gamma quanta with the electrons of the atoms. A scattered gamma quanta with a smaller energy and a recoil electron, which was torn away from the atom, and which obtained some of the energy of the gamma quanta, appears as a result of this interaction, as it is known. During the Compton-effect part of the initial gamma quanta leaves the beam

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

in a form of scattered gamma quanta.

The soil, together with the moisture contained therein, is very heterogeneous, that is why in order to determine the suitability of the gamma method for the measurement of the soil's moisture content, it was necessary to conduct multiple experiments with soils of various moisture contents.

A conversion apparatus of a type PS-64 with meters for gamma quanta of a type MC-4 were used at the beginning of the experiments as measuring equipment. Tabulation of impulses was conducted with the aid of an electromechanical meter of a type SB-1. The nature of experiments consisted in the following:

The dried soil, weighing 1-3 kg was placed in a cylindrical aluminum vessel, which was placed on a lead container with the Co^{60} isotope. An opening in the lead container for the discharge of a beam of gamma rays was made exactly opposite the center of the bottom of the cylindrical vessel. Consequently, gamma rays were directed along the axis of the cylinder. The meter for gamma quanta was placed on a stand above the soil. The count of gamma quanta was carried out for 5 min (twice or thrice) with gamma rays passing through a dry soil, and then again after moistening the soil to 5, 10, 15% and so on.

Even the first experiments in 1953-1954, which were begun in the Scientific-Research Institute for Hydrometeorological Apparatus Building have shown real usefulness of the gamma method for measuring the moisture content of the soil.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

. Water in the soil
x Water separately.

Title of figure 1. Change in the intensity of gamma rays when they were passed through a 32 centimeter layer of clayey soil with various moisture contents.

A diagrammatical function in the modification of intensity of gamma rays, produced by the moisture content in the clayey soil (for a layer of soil 32 cm high), is presented in figure 1. One should note, that similar layers of water, which are found in the soil, or apart from it, cause a similar reduction of gamma rays.

The rate of reduction of gamma rays by water in the soil, and by water outside of the soil are marked accordingly by dots or crosses.

The curve obtained in figure 1 is exponential and is subject to the equation (1). [Begin p.78]

The mass coefficients of gamma ray reduction by water in a chermozem soil and by water separately, which was obtained under laboratory conditions, are shown in table 2.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 2.

A layer of water in the soil in cm	Coefficient of reduction	A layer of water outside of the soil in cm	Coefficeint of reduction
2	0.049	2	0.052
3	0.054	3	0.053
4	0.054	4	0.052
5	0.051	5	0.053
6	0.050	6	0.051

As it is seen from table 2, the obtained value for mass coefficients of gamma rays reduction by water in the soil comply with the values of these coefficients for water alone.

This coefficient was found to be the same for the water in other soils too. Therefore, one and the same layer of water, occuring in this or another soil will cause a similar reduction of gamma rays of a given energy. This condition confirms convincingly the possibility to use gamma rays for measuring the moisture content in the soil.

For evaluation of gamma radiations under field conditions we used a very simple meter for rate calculation of gamma quanta; the meter was characterised by the fact that it works from one single tube, without a separate anodic voltage.

A general diagram of such an apparatus is presented in figure 2. It is seen from the scheme that at the beginning of measurements, a positive potential from a small battery of high voltage was supplied on the cathode and anode of a tube 2P1P, which was utilized in a triode regime. Under the reaction of ionizing radiation the negative impulses of the current proceed from the anode of the counter tube of gamma quanta to the accumulating compartment, which consisted of the condenser C_1 and of the resistance R_1 to the anode of the tube.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The value of the negative potential on the anode of the tube will be the higher, the greater is the accumulated charge on the condenser C_1, which in its turn will accumulate depending on the intensity of the ionizing radiation. An indicating instrument (microammeter) is connected to the grid circuit of the tube; a positive potential of $\sim 6_{\Lambda}^{\text{to}} \sim 7$ volts was supplied to the grid through the indicator. In the absence of an ionizing radiation the grid current will be the highest. Under the influence of an ionizing radiation the negative potential on the anode will decrease the grid current, its amount will show the degree of intensity of the ionizing radiation.

Title of figure 2. Diagram of a meter, to measure the intensity of gamma rays for determining the moisture content of the soil and of the stores of water in the snow covering.

For damping the arrow of the microammeter and for a reduction of its fluctuations at the expense of a fluctuation of the ionizing radiation, into the circuit, anode - [Begin p.79] grid, a capacity load of an order 16 μF was cut in, which increased the accuracy of measurement.

For the control of constancy of voltage, which was supplied to the meter tube of gamma quanta and to the cathode of the radio-tube, a control

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

for these voltages was provided in the apparatus with the aid of the self-same microammeter. Control of voltages decreases the errors, which can arise on account of instability of these voltages as the feeding batteries become obsolete and used up. The displacement on the grid of the tube was also controlled.

Switching on of the measuring apparatus and connection of the microammeter for the control of voltages were achieved with the aid of a change-over switch. Connections of individual circuits are marked on the diagram by numerals.

The apparatus was mounted on a block which was fastened by angle-irons to a small box.

This apparatus permits one to measure the moisture content in the soil through the full range: from the field moisture capacity up to the absolutely dry soil with an accuracy of 1.5%.

Title of figure 3. Diagram of the set-up in the soil of the shaft with radioactive Co^{60} and with the holder of gamma ray (gamma-quanta) meter for stationary measurements.

Words in the diagram: the meter, gamma ray tube, soil, rod, isotope, lead.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The measurement of moisture content can be conducted with the aid of gamma rays in two variants.

During the first variant the moisture content of the soil is measured down to the depth of 50 cm through the reduction of the vertical beam of gamma rays, and in the second variant, which permits one to measure the moisture content in the soil down to a depth of 1.5 - 3m through reduction of the horizontal beam of gamma rays.

For measuring the moisture content in layers of soil down to 50 cm one drives into the soil a metallic shaft (figure 3) in its lower edge there is a sharpened bulge holding a container for the radioactive isotope of cobalt, while the holder of the gamma ray tube is put on the upper part of the shaft. The metallic rod, after having been driven into the soil, is turned to 90° so that the shear, with the bulge at the lower end, would enter under the undisturbed layer of soil. The slit in the soil, which was formed during driving in of the rod is covered up and packed somewhat. The metallic rod is left in the soil during the whole time of observations.

At the moment of observation the gamma ray tube is inserted into the seat of the holder and is connected to the apparatus with the aid of a flexible cable. Earlier the apparatus is subjected to a calibration, the point of which is to determine the value of graduation of the microammeter's scale, that is in order to determine what layer of water (in mm) must be added to the soil, so that the needle of the apparatus would move one point. The apparatus is so designed that a change in a 1 mm water layer corresponds to the movement of the apparatus' needle approximately by 1 or 1.5 point on the scale.

At the moment of driving in of the metallic rod into the soil one moves the holder of the counting tube vertically along a metallic pipe, which

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

is put on the rod and one chooses a most suitable distance for the counting tube from the source of radiation estimating so that the needle of the apparatus be stationed at that point of the scale which will correspond the nearest to the supply of water in the measured layer of soil. For instance, if the supply of water in a 20 cm layer of soil equals 40 mm, then the gage is placed, from the source of radiation, [Begin p.80] at such a distance that the needle of the apparatus be set on the 40 mm point on the scale of the apparatus. This rigidly fixed distance of the gage from the source of radiation remains later on for the full period of observations. The supply of water in the layer of the soil at the beginning of observations must be determined by a method of oven drying of two to three core samples of soil taken with the aid of a soil sampler near the rod with isotope $_{27}Co^{60}$ which was plunged into the soil. The core samples for drying were taken from the depth where the radioactive isotope Co^{60} was buried. The supply of water in the soil which was thus obtained was accepted as an initial (datum mark) for further observations. For instance, at the moment of plunging the isotope into the soil to the depth of 30 cm the moisture content in this layer was 80 mm and the apparatus needle at that time was on the 70th point of the scale (the value of graduation corresponds to 1 mm of the water layer). If during the next observation the apparatus needle will be found on another point of the scale, for instance on the 50th, this will show that in the 30 cm layer of soil the moisture content dimished by 20 mm. Strong storms or showers can remove or wash away part of the soil, which is over the source of radiation. This can be reflected on the accuracy of measuring the moisture content of the soil. In such cases it is recommended that one repeat the measurement of the moisture by a method of oven drying.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Title of figure 4. Diagram of a set up of pipes in the soil for measuring the moisture content in the soil by horizontal beams of gamma rays.

Words in the figure: the meter, lead, isotope; on the right side: soil, gamma ray tube.

To measure the moisture content in the soil by the second variant, which makes it possible to measure the moisture to a depth of 2-3 m., one needs to install vertically in the soil two pipes made of "viniplasta" [a plastic, probably], or of any other materal, at a distance of 30-40 cm (figure 4). These pipes should remain in the soil during the whole time of observation of the moisture content in the soil. During the moments of measurement of the moisture content in the soil isotope Co^{60} is lowered through one of the tubes to a desired depth, and the gamma ray tube, which is connected to the apparatus, is lowered through the second tube. It is easy to see that by lowering to either depth through the tubes, the source of gamma radiation and the gamma ray tube one can measure the moisture content of the soil at any depth. For this measuring variant only one preparation of Co^{60} will be required; it can be carried in the container from one section to another.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The soil exhaust pipes for thermometers can be utilized for measurements. In order to start the measurements by the horizontal gamma rays it is also necessary to take control samples of soil and establish the moisture content by a heating method, in order to obtain initial values of moisture for depths in which later on the measurements are to be made. The washing away of parts of the soil by showers or its transfer by winds will not affect the accuracy of the gaging of the moisture content in the soil by horizontal gamma rays as the mass of the soil in the path of gamma rays will remain almost constant. Small changes in its density can take place only in the upper layer.

Results of laboratory experiments have shown that similar layers of water, contained in various soils, produce the same reduction of gamma rays. A graph is plotted in figure 5 [Begin p.81] between the readings of the apparatus and the moisture content in Kurskii chernozem and in a clayey soil near-Moscow. Two dry samples of these soils, weighihg 2 kg each, were taken for this experiment. The samples were placed into similar aluminum cylindrical vessels and were put on top of the container with isotope Co^{60}, and over the vessel the gamma ray tube was set-up on a stand.

Title of figure 5. Readings of the apparatus, which measured gamma radiation depending on moisture content in a clayey soil and in a chernozem.

Words in the above figure: at left - Readings form the scale of the

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8 % of moisture.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

At first the intensity of the gamma radiation was measured at the passing of gamma rays through a dry soil, and later after each moistening. As it is seen from the figure, there occured a pretty good correlation among the layers of water in the soil, the moisture in per cent and the readings of the apparatus, which was measuring the gamma radiation. Instead of an exponential curve here a straight line was obtained because the measurements were conducted on the section of the exponential curve, which was close to a straight line and at the expense of a wide beam of gamma rays.

Title of figure 6. Relation between the readings of the apparatus, which was measuring gamma radiations and the moisture content in the soil in per cent.

Words in the figure: At the top: graduations on the scale of the apparatus; at the bottom: moisture content in the soil in per cent.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Results of field measurement of the moisture content in the soil by gamma method and by a method of oven drying, which were conducted during summer-fall period in Khimky, near Moscow in 1954 are graphically depicted in figure 6. The control samples of soil in the form of 1-2 core samples were taken, in this case, near the isotope Co^{60} which was plunged into the soil, from the depth where it was placed (40 cm) and were carefully dried. As seen from figure 6, the deviations of individual points from the obtained straight line did not exceed 1%, which mainly refers to the inaccuracy of the control (oven-drying) method.

Tillage of the soil near the buried isotope does not require any control measurements if the apparatus, which is measuring the radiation, is used to measure the content of moisture in the soil before its tillage or at the same place after the cultivation. Deflection of the apparatus' needle because of the displacement of a part of the soil during its tillage can be then taken into consideration. When working with the radioactive Co^{60} one needs to take precautions, which are established by the rules.

Yet, taking into consideration, that when measuring the moisture content in the soil, preparations of only small radioactivity will be utilized (up to 10mC), and, besides, they will be kept in the soil, which will reduce the gamma radiation, then it will be safe for the observer, and the apparatus, to be at a distance of 70-100 cm from the source of radiation. Choice of radioactivity of gamma preparations depends on the depth of their insertion and on the density of the ground. For depths of 40-50 cm the activity of the preparation must be of 10-12 mC order, but for a depth of 15-25 cm about 4mC. In order to obtain an error less than 0,5%, because of the fluctuation, of the radiation, [Begin p.82] the speed of the count of impulses by the apparatus must be 18000-26000 imp/min.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The gamma method permits one to obtain the most trustworthy data on moisture, contained in that or another layer of soil.

Measuring the moisture content in the soil by gamma method is possible mainly under stationary field conditions, when the mass of soil between the radioactive source and the recorder of gamma quanta remains constant. This is accomplished with the aid of variants of plunging the isotope Co^{60} into the soil, as it was cited earlier. In this case the variations in the changes of the intensity of radiation will be caused only by changes in moisture content of the soil.

For single field evaluations of the moisture content in the soil this method is of little use because during each introduction of the rod, with the radioactive source, into the soil, the reduction of gamma radiation will be influenced not only by the moisture content of the soil, but also by a different density of the soil. However, taking into consideration that the specific gravity of certain soils varies but slightly, the gamma method can also be applied for rough, single evaluations of the moisture content in the soil under field conditions. For this purpose one must conduct a careful calibration of the apparatus for each depth in order to consider the reduction of gamma radiation by the soil itself.

The neutron method is also tempting for the measurement of moisture content of the soil; it is based on the peculiarity of the hydrogen-containing mediums to slow down the fast neutrons to the speed of the slow (thermic) neutrons.

For detection and measuring of density of thermic (slow) neutrons a nuclear reaction of a type $B^{10} + {}_0n^1 \rightarrow Li^7 + He^4$ is utilized. The nuclei of lithuim and helium, which are the result of this reaction, flying apart into directly opposite sides, correspondingly have an energy of 0.9 and 1.16 MeV and produce ionization

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The meters for thermic (slow) neutrons, as it is known, are filled with boron trifluoride (BF_3).

W. Gardner and D. Kirkhem (4), in order to measure the moisture content of the soil, utilized as a source for neutrons an ampoule, containing a mixture of polonium and beryllium. This source emitted neutrons of various energy with a maximum around 5.2 MeV, and had a half-life of about 140 days. As hydrogen in the soil is found not only in water, but also in organic substances, it is difficult to accurately measure the amount of water, contained in the soil, by the neutron method, although some authors think that the amount of hydrogen in the soil humus constitutes up to 5% of the weight of humus.

The curve of the number of counted impulses plotted against the moisture of soil, obtained by Gardner and Kirkhem, shows that the scattering of points relative to the curve reaches 3-5%.

There is a great defect in the neutron method; one needs a voltage of 1200-1300 V in the recorder during the measurements. Yet a fast development in the technics for measuring the nuclear particles will make the utilization of the neutron method for measurement of soil moisture content also possible.

1. The

Conclusions.

1. The gamma method for measurement of moisture content in the soil has been developed and preliminarily tested under laboratory and field conditions; it permits one to obtain data on the soil's moisture without disturbing the structure of the soil and without extractions of soil samples with the aid of a soil sampler.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

2. This method permits one to obtain, under stationary conditions, data about the moisture in the soil for any layer, up to a depth of three meters and over.

3. The accuracy of measurement of soil's moisture content by the gamma method is not surpassed by the absolute (the heating) method but can be higher because the gamma method permits one to integrate the moisture content in a layer of soil, whereas the thermostatic method permits one to measure the moisture in a certain local point in the soil.

4. A portable field apparatus was developed for measuring gamma radiations; it is utilized for the measurements of the soil's moisture.

Literature

1. Bochkarev V., Keirim-Markus I., L'vova M., Pruslin Ia, Measuring of the activity of sources of Band gamma radiations. Izd-vo AN USSR, 1955.

2. Groshev L., Absorption and dispersion of gamma rays. Uspekhi fisicheskikh nauk, v. 26, no. 6, 1936, v. 27, 1937.

3. Shpol'skii E. V., Atomic physics. Gos. izd-vo tekhn. teor. lit-ry M.-L., 1950.

4. Gardner W. and Don Kirkham, Determination of soil moisture by neutron scattering. Soil Science, 1952, vol. 73.

5. Van Bavel C. H. M., Hood E. E., and Underwood. Vertical resolution in the neutron method for measuring soil moisture. Transac. Amer. Geophys. Union, 1954, vol. 35.

Science-Research Institute
for Hydrometeorological
Apparatus Building.

Entered the editor's
office on 14. v.
1955.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Plant diseases [Yearbook of agriculture, USDA, 1953]

(A Russian "flyer" about the Yearbook, inserted in Zemledelie, no. 6. June 1956. 20 Z44)

Publishing house
of Foreign Literature

A book, which is being prepared for printing:
"Plant Diseases"
under the editorship of A. Stefferud

In the book "Diseases of Plants", volume with 100 plates, and which was published by U.S.D.A. in 1953, and issue of 250 thousand copies, results are given on the most important achievements in the field of studies of diseases of various cultivated crops - field, vegetable, fruit, plants for sodding airfields, and sports grounds. The book consists of 149 articles, written by a large collective body of the greatest phytopathologists in U.S.A., who are working in various fields of plant growing, of phytopathology and sciences allied to it.

A 784

In this book is generalized the modern scientific knowledge about plant diseases and the results of practical use of this knowledge in various soil-climatic zones.

The book consists of 15 sections and covers a wide range of problems: from the complex problems on the variability and the formation of fungal forms, on regularities in the resistance of plants to different diseases up to a practical utilization of various agromeasures for the control of plant diseases; on different chemical preparations and machines.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The book contains interesting data about the losses in crops and about losses which are brought on U.S. agriculture by the most widespread diseases of plants. Much room is given to the review of the most important methods for control of diseases of agricultural plants, which are caused by parasitic fungi, bacteria, viruses and nematoda. Results of utilization of new fungicides for disinfecting and sanitation of soils, of seed, and of planting materials are also cited. [Begin the opposite page]

The sections in the book, which are given to problems on propagation and introduction into cultivation of new varieties of cultivated plants, resistant to disease, are of exceptional interest for affecting an increase in the yielding capacity of agricultural crops. It is sufficient to say that even by 1953 50% of the whole planting area in U.S.A. was occupied by varieties of cultivated plants which are resistant to diseases. For the total yield of all the basic crops, which is evaluated as 12-15 billion a year, the increase in yield, is evaluated at 600-700 mln of dollars, when plants are cultivated, which are resistant to disease, according to a data in the book.

In this book of considerable interest to the Soviet reader will be the extensive materials about methods of propagation of varieties of wheat, sugar beets, cotton, fruit trees, and so on, resistant to disease. Eight sections in the book are given over to diseases of a series of crops: grain and legume grasses, cotton, grain and vegetable crops, sugar-producing plants, tobacco, ornamental plants, fruit and nut-producing crops. Diseases of crops which happen during their transportation and storage are treated separately. Diseases of flax, oak, pine trees, and others are also reviewed separately.

The book has 120 colored illustrations, with the aid of which it is easy to recognize many diseases of plants and their pathogens.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The book, which will be published, is a valuable practical reference book, which is needed by every agricultural experiment station, selection station, [illegible] stations for plant protection, by the teaching personnel, the aspirants and students of agricultural universities, agricultural technical schools, biological-soil faculties in the universities, agriculturists-husbandmen, vegetable growers, fruit growers, sylviculturists, workers in ornamental horticulture, specialists in chemical industry, who are occupied in production and search for means for control of diseases in agricultural plants.

The book will be published in the middle of 1956.

Advance orders for the book must be sent to the local book store or to the department "Kniga-pochtoi" [Book by mail], store no. 95, Mosknigatorg, Moscow B-150, Podbel'skogo street, 7/20.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Trans. A-785
(In full)
vg/A

Eikhfel'd, I. G.

Zemledelie na Krainem Severe.

[Agriculture in the Extreme North]

Akad. Sel'sk. Khoz. Nauk im. V. I. Lenina,
Doklady, vol. 8, no. 4, pp.39-40,
1943. 20 Akl

(In Russian)

Agriculture in the Extreme North has grown markedly in the last 10-15 years. Since 1926 the cropping area has increased more than 7 times, and the heads of livestock have also increased in number. In some places cultivation of grain crops in recent years has reached 68° north latitude, potatoes and vegetables - 70°. By now, agriculture has advanced as far as the shores of the northern seas. Plants which do not require warm weather are cultivated successfully in open ground at the Ust-Yenisei Port, in Dudinka, on the Taimyr Peninsula, in the Tiksi Bay, and in the Bay of Chaun [Chaukskaia Guba], while vegetable production is developing in hot-houses even on the isles of polar seas. Interesting information can be obtained in material of the Conference held in 1943 on Problems of Agricultural Development in the Extreme North.

A 785

It became apparent that high yields of grain crops can be produced under northern conditions. Thus, in experimental plantings in 1942, the Salekhard Station obtained 19.7 centners per hectare of barley, the Beregovo Station - up to 31 centners of barley and up to 38 centners of oats, the Kondinsk Base - up to 20 centners per hectare of spring wheat. At the Khanty-Mansiisk and Yartsevo Bases stable yields of barley, oats and

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

wheat which often reach 30 c/ha have been obtained for a number of years. Oats and barley varieties which are particularly outstanding in point of early ripening and productivity were obtained by selection conducted by the Khibiny Polar Experimental Station of the All-Union Institute of Plant Industry.

Very indicative are also potato yields. In Naryan-Mar on the Pechora shore, the best potato varieties obtained in the variety tests of 1942, produced 300 c/ha at Salekhard and Berezovo on the Ob shore - an average of more than 200 for a number of years, at the Khanty-Mansiisk and Kondinsk Bases - 250--300 centners. At Igarka, the average obtained for 5 years was 250--289 centners, and the 1941-1942 average was 310--362 centners. The best varieties proved to be those selected by northern stations (Khibiny, Igarka), by Siberian experimental institutions (Tulun--Omsk), and also selections derived from local early-ripe forms.

It is interesting to note that at the northern experimental stations the tops of consumer potato tubers planted in 1942 also produced good results. At the Igarka Experimental Station, tops which had been stored for 105 days produced a yield of 300 c/ha while controls (whole tubers) gave 272 centners. Higher yields are produced on plantings of vernalized tops.

High potato yields are obtained also on large areas under commercial conditions. Thus, according to data of the agronomist M. I. Khrennikova, in the Yenisei North at 70--71° latitude, potatoes produced the following yields: in 1941 at Khatanga - up to 186 c/ha, at Norilsk - up to 320, in 1942 at Dudinka - up to 329 c/ha, at Igarka - up to 360.

In the Shuryshkarsk District of the Yamalo-Nenets Region [okrug], comrade Gordeev, Agronomist of Raizo [Land Department], produced 270 c/ha of potatoes from vernalized tops.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Data on vegetable crops also deserve consideration. The seven-year average produced by white head [belokochannaia] cabbage in Naryan-Mar was 483 c/ha, in Salekhard (1938) - 343, in Berezovo (1939) - 186 c/ha. The 5-year average yield obtained from the same crop was: at Khanty-Mansiisk - 198 c/ha, at Verkhoiansk - 195 c/ha. In Igarka white-head cabbage produced an average of 181 c/ha for 9 years. The best varieties of table rutabaga also stood out as regards productivity: at Naryan-Mar - up to 500--600 centners, in Salekhard and Beresovo - up to 300--400. In 1941 an Igarka sovkhoz succeeded in producing 499 c/ha.

When seed was vernalized satisfactory yields were obtained even from warm climate crops planted in late fall (carrots), or when grown from seedlings (beets): the yield at northern stations was up to 100-150 c/ha, and 200 and above - at southern stations.

The best indicators are produced by vegetable varieties developed or improved by repeated selection at northern experimental stations.

Experimental institutions pay a great deal of attention to agro-technical and fertilizing problems.

It is significant that the Khant-Mansiisk experimental station located in the Obi River flood plains obtains high yields of all crops by applying minimal amounts of fertilizer. Yields of oats, barley and even spring wheat have often reached 30 c/ha. Newly reclaimed taiga lands require considerable amounts of fertilizer and lime.

On the flood plains in the Enisei River valley in the Igarka District, 120 centners per hectare of potatoes were obtained the first year these lands were adapted, when manure was applied at the rate of 50 c/ha. When manure was applied in smaller amounts, but was supplemented with mineral and local fertilizers, the yield of cabbage exceeded 300 centners per hectare.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Biriuzov, I.

Voprosy severnogo zemledeliia.

[Problems of agriculture in the North]

Sovkhoznoe Proizvodstvo, vol. 4, no. 12.
p.25. Dec. 1944. 20 So65

(In Russian)

The northern climate is severe. In the absence or marked deficiency of vegetables, fresh meats and dairy products, it causes incidence of avitaminosis, scurvy and anemia. Yet it is very difficult to ship these products to the remote districts of the North.

This is why vegetable farms and dairy, swine and poultry farms have been included in northern construction. Agriculture has been emerging largely in districts where it has never been practiced heretofore, and under conditions considered unsuitable for agriculture.

During the Great Patriotic War northern agriculture grew and gained strength; it turned from commercial installations into local migratory kolkhozes, and hunting and fishing communities. Collective and individual gardening is developing extensively.

The agronomists of northern agriculture have done great, painstaking work which has not yet been summed up by anyone and has received almost no publicity in the press. Meanwhile very valuable results deserving of the most serious attention have been obtained in a number of cases.

A 786

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Let us take a problem such as the transformation of barren brush-wood soils into fertile resources within a short space of time. In areas of the Extreme North where only a year ago forests, shrubs and swamps were found, thousands of hectares of virgin land have been plowed and good vegetable and potato yields have been produced on them.

The soil, as a rule, had to be created. Quicksand and podzols were mixed with humus and earth peat. They were supplemented with ashes, mineral fertilizers and lime. Peat, lake silt, sod and various composts were utilized widely. Peat and heavy lime soils were drained with the aid of deep ditches and fertilized with lime, ashes, sod etc. after they had been plowed. All new soils were plowed repeatedly so as to expose them to the action of atmospheric oxygen before plants were transplanted. In northern districts, especially in those in a perpetually frozen state, vegetable and potato yields produce the best results in hills [grebni] and narrow rows. There warmth and air are amply available to the roots of plants. It is known to be true that uneven soils dry up more rapidly. Nonetheless, in Pechora higher yields were obtained from hill plantings even in last year's dry summer. The point is that in dry years increased thawing out of frost compensates for deficiency of moisture.

The northern summer is brief. Hence the preparation of tubers before their planting exerts a decisive influence upon the potato yield. For this purpose well lighted rooms are utilized. In recent years, in the North vegetable store-rooms are built with light hatches which are heated in the winter so that the potatoes could be vernalized in the spring in the same store-rooms. At Ukhta vernalization of potatoes was accomplished in vegetable store-rooms with electric light. The results were the same as those obtained by vernalization with solar light.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

It has been established that under northern conditions it is better to vernalise potatoes at a reduced temperature - 12--15 degrees C, for at a higher temperature - 20--25 degrees - the potatoes spoil readily, even though the vernalization process proceeds more rapidly. Vernalization without the use of light takes more time, but it eliminates almost completely spoilage and waste of potatoes.

Shortage of seed material prompted the workers of the North to apply widely the method of planting the tops of tubers and eyelets, as proposed by Academician T. D. Lysenko. Thousands of examples can be cited of high vegetable yields grown on new, just reclaimed soils from tops and eyelets.

The question as to the time for potato planting, which still is being hotly disputed, is of essence to the North. Nonetheless, years of experience of the Ukhta, Abezi and the Kolyma settlements and of other northern bases indicate that it is necessary to adopt early planting dates without fear of injury to sprouts caused by early spring frosts. Even if such injuries do occur, the plants recover from them rapidly. On the other hand, in a case of delayed planting, early autumn frosts cause plants irreparable damage.

For the purpose of reducing the vegetative period, the seedling method of forcing cabbage, beets and rutabaga is applied widely in the North. The seedlings are frequently grown in peat-manure pots which, in transplanting, protect the root system from injury and, at the same time, serve as a fertilizers.

Of great importance to the new soils of the North is supplementary feeding. All types of fertilizers are used for it - mineral, barnyard manure [ptichii pomet], overfermented solutions of excrements and of manure.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Irrigation of potatoes produces a good effect in a dry summer. As a result of this practice, a number of Ukhta gardners doubled their potato yield last year.

There is available an accumulation of much experience in the control of agricultural pests of which the North has very many, contrary to theoretical hypothesis. Larvae of the cabbage fly are now successfully controlled by accelerated fertilizing-irrigation and high hilling of the plants. The latter causes the growth of additional lateral roots which compensate for the first roots destroyed by larvae. Achievements are registered also in the organization of covered ground which is very important for the North where crops are grown from seedlings.

* * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8 A-787
(Abstract)
vg/A

Dadykin, V. P.

Osobennosti povedeniia rastenii v kholodnykh pochvakh.

[Characteristics of plant behavior on cold soils].

In Vsesoiuznoe Botanicheskoe Obshchestvo. Voprosy Botaniki, Moskva, Akademiia Nauk SSSR, vol. 2, p.465-489. 1954. 459.2 V96V

(In Russian)

In accordance with current opinion, the perpetually frozen state of soil is determined by geological and geographical factors, including paleoclimate and present day climate. In the area adjoining perpetually frozen ground the frost disappears in the fall, on the eve of a new frost. According to calculations of M. I. Sumgin, S. I. Kachurin, N. I. Tolstikhin and V. F. Tumel (1940), the area of perpetually frozen ground comprises 20 to 25% of all dry land.

Those who seek an explanation of the behavior of plants living in perpetually cold soils usually turn to works of plant physiology in which up to now the old experiments of J. Sachs [Iu. Saks] were found. His belief that moisture in cold soils was inaccessible to plant roots led to the theory of a physiological dryness of cold soils. Recently, in connection with physiological investigations in the Extreme North, some authors have rejected the theory of physiological dryness (Maksimov, 1926; Bystrov, 1939; Danilov, 1948; Val'ter and Begacheva, 1950, and others).

It has been noted that plants in the Extreme North have unique means of adapting themselves to the conditions of their habitat. Among them are:

A 787

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

1) an almost complete absence of annuals which is due to the short vegetative period in which annuals have no time to develop and to produce ripe seed; 2) prevalence of viviparity; many species produce no seed; instead of the normal flowers or spiklets, they develop buds or bulbs which sprout and turn green on the plant itself; 3) an abundance of evergreen forms... 4) squatting capacity [prizemistosts'] and an abundance of creeping plants which permit these forms to utilise the warmer surface layer of the air and the top horizons of the soil... 5) a series of adjustments protecting the plant against strong light (pubescence, wax film, red pigmentation of leaves, their shiny surface etc.), and also adaptability to the long polar day. In addition to these characteristics of the surface parts, the roots must also possess an inherent capacity to adapt themselves to extremely low soil temperatures.

Only a few works have dealt with the distribution of plant roots in the soils of perpetually frozen districts (Sukachev, 1912; Abolin, 1929; Pulling, 1918). E. I. Tsyplenkin (1940) believes that isotherm +5° in the soil is the limit for the distribution of wheat roots. Thus, the soil layer between 0° and +5° represents a zone physiologically inaccessible for plants. It is not easy to agree with the latter conclusion, since plants are capable of changing their requirements as regards temperature and environmental conditions.

The author further describes his two-year experiments with oats, the roots of which reached soil layers where the temperature was +5° and then failed to climb higher than +1°.

A study of root distribution in soils frozen at the end of summer at a depth of 50-60 cm. was accomplished by digging them up in August and September. A list of wild plants and the results of their investigation follow. Some of these plants had surface roots only.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

V. G. Grigor'eva (1950) investigated the viability and activity of roots in frozen soil. On cuts of the meristamatic ends of roots, a considerable amount of dividing cells were discovered in the stage of anaphase and metaphase. The results of Grigor'eva's experiments showed that the roots of horsetail etc. participate in the processes of plant metabolism while in a frozen state.

Wild species were divided into three types according to the soil depth penetrated by their root system (Dadykin, 1950, 1952). Cultivated crops the roots of which were investigated included oats, barley, winter and spring wheat, potatoes, various vegetable crops and some forage crops. The investigations disclosed that the roots of grain crops grown in cold northern soils were scarcely different from those grown in the agricultural districts in the central belt of the Soviet Union. The maximum depth reached by barley roots was 102 cm, by oats 105, spring wheat 98, and winter wheat 158 cm. Sabinin (1949) is of the opinion that low soil temperatures inhibit the synthesis of nucleic acids in the roots.

Subsurface organs of vegetables showed no deviation from those grown in warmer climates. Potato roots failed to reach the soil depth penetrated by this crop in warmer soils (50-70 cm instead of 80-120 cm). A study of potato root dynamics refutes the opinion that the subsurface organs of potatoes grown in perpetually frozen soil remain in the upper soil layers; they actually develop and penetrate the soil more rapidly than potato varieties grown in warmer climates.

The presence of roots of local northern flora in deep and frozen soils prompted an investigation of their water regime. A careful study of transpiration, involving the use of torsion scales, showed that the plants did not experience a lack of water. Osmotic pressure of cell juice was determined by the cryoscopic method. The results are indicated in table 1.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 1.

Osmotic pressure of cell juice in leaves of some plant species in the Extreme North in relation to the distance of frozen soil.

Name of plant	Habitat and depth where frozen state occurs	Osmotic pressure (in atm.)
	Sphagnum swamp; 20 cm.	27.41
	Birch-larch sparsely wooded forest; 35 cm.	22.60
Betual exilis	Sphagnum swamp in subsiding relief; no frozen state at depth of 1.5 m.	21.88
	River bank; no frozen state	17.66
	Peat hill; 25 cm.	20.86
Larix sibirica	Birch-larch sparsely wooded forest; 32 cm.	20.44
	Wet sphagnum swamp; no frost	18.70
	Slope of hill with Betula exilis on sphagnum; 25 cm.	18.52
Picea obovata	Birch-spruce forest with horsetail and sedge 42 cm.	16.12
	River bank; no frost	14.68

In registering the magnitude of water deficiency it was found to be no greater than in the same species occurring in much warmer climates.

A count of transpiration for the whole vegetative period gives an idea of the water regime in plants whose root system had been exposed to periodic chilling (table 2).

Table 2.

Transpiration of barley plants in periodic chilling of their roots (in cm^3 per vegetative container for 10 days)

Experimental variation	TRANSPIRATION for 10 days								
	I	II	III	IV	V	VI	VII	VIII	Total
1. Warm the whole time	-	927	1972	2155	2062	1298	1636	765	10521
2. Warm up to heading, then cold up to maturing	-	1185	2865	3106	2537	1386	1399	819	13297
3. Cold up to heading then warm up to maturing	-	268	640	687	848	638	798	348	4117
4. Cold the whole time	-	256	649	718	875	649	838	421	4506

Note: Underlined figures indicate the ten-day periods during which the vegetative containers were cooled.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The fact that there were no sudden changes in transpiration also refutes the hypothesis of a physiological dryness of cold soils. The changes from cold to warm soil and vice versa did, however, exert an influence upon the water regime and the growth of plants.

At this point it occurred to the experimenters that retarded plant growth and development might be due to difficulties experienced in utilizing some nutrient substances., and they conducted painstaking experiments using the method of isolated feeding and "isolated temperatures". Table 3 shows the weight of shoots which were fed water and all nutrients from a warm solution, and the weight of shoots fed warm water, but nutrient substances from a cold solution.

Table 3.

Influence of low temperature of a nutritive solution upon the weight of shoots (relative magnitudes in %)

Experimental variation	Barley		Oats	Winter rye	Winter wheat
1. Warm water, warm NPK solution	100	100	100	100	100
2. Warm water, cold NPK solution	41.7	34.9	33.7	76.1	60.0

Experimental results indicated that retarded growth was due to difficulties in utilizing nutrients and not water.

The magnitude of osmotic pressure of cell juice conveys an idea of the absortive [sosushchaia] strength of roots. To determine the water retention capacity of the soil the experimenters used the dry seed of vetch as osmometers and thus established that the osmotic system of plants is capable of obtaining water from frozen soil, that water retention by soil depends on temperature, and that the absolute magnitude of the strength that retains water in frozen soil is comparatively high. Table 3 indicates that depression of growth when the root system is chilled is due to the influence of

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

low temperatures upon plant utilization of nutrients. Vegetative experiments have disclosed a direct relation of the effectiveness of fertilizers to soil temperature. In applying fertilizers to cold soil it is essential to know how much plants absorb of each of the basic fertilizers (nitrogen, phosphorus and potassium) from an environment with a low temperature. Pertinent information is cited in table 4.

Table 4.

Influence of temperature of nutritive solution upon the consumption of individual types of fertilizers by plant shoots (weight of shoots in relative magnitudes)

Name of plant	Experimental variation				
	Warm NPK solution, warm water (control)	Cold NPK solution, warm water	Cold N solution, Warm PK solution	Cold P solution, Warm NK solution	Cold K solution, warm NP solution
Barley	100	41.7	53.3	107.1	95.6
Oats	100	32.0	46.6	91.6	97.9
Winter rye	100	56.6	60.5	96.5	97.6
Winter wheat	100	46.9	36.1	84.8	71.8

Various forms of nitrogen are assimilated inadequately by plants whose root system is placed in a solution with a low temperature. Consequently, the reason for the unsatisfactory growth of plants at low soil temperatures is poor availability of nitrogen.

A chemical analysis has shown that chilled plants have a larger total of nitrogen content than others. Their percentage of non-protein nitrogen, however, is higher than that of protein nitrogen. These data and the works of other authors (Maksimov, 1939; Prianishnikov, 1945; Sabinin, 1949 etc.) indicate that low temperature interferes with nitrogen availability less than with the processes of its conversion into and formation of compound organic substances produced by the roots.

The growth of plants can be influenced to a certain degree by selecting

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

the appropriate microfertilizers and by defining the exact rate of their application when the temperature of the nutritive solutions is low. Among the microfertilizers which exert a positive influence upon yields grown in low temperature soils are boron, lithium etc. Increased concentrations of nutrients in control containers always causes a decrease in yield; in experimental chilling there occurs some increase in the weight of plants as the concentration increases.

A more effective means of overcoming the difficulties of plant consumption of fertilizers in cold soil is foliar feeding, since the nutrients penetrate the leaves and thus avoid the cold soil.

Low temperature influences the growth of plants. Cultural plants introduced to the North recently tend to shift their developmental phase to the autumn. This is not the case with indigenous plants.

Three-year experiments with barley have demonstrated that plant resistance to low soil temperatures can be increased by following Michurin's biological principles of directed rearing for several generations. A study of the characteristics of plant behavior on cold soils is a prerequisite for the development of agriculture in the North.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Dadykin, V. P.

O zhizni rastenii v usloviiakh Severa.

[On the life of plants under conditions of the North]

Vsesoiuzn. Obshch. po Rasprostraneniiu Polit. i Nauch. Znanii [Broshiury-Stenogrammy Lektsii]. Ser. 8. [Estest.-Nauch. Ser.] 1954, no. 60, 24p. 410.9 V97

(In Russian)

The following are the peculiarities of nature in the Extreme North: rather low temperatures of the air both in summer and in winter; late spring and early fall frosts; a long arctic day in summer and a long arctic night in winter; presence in most regions, of eternal congelation, or, at least, of very low temperatures in the layers of the soil which are of great importance to the life of plants. Precipitations, both in summer and winter, are quite moderate, with the exception of Extreme West and East, where the proximity to the sea is reflected in a more abundant precipitation.

The soils are mostly podzolic, with a various degree of podzolization; also swampy-gley soils. The northern soils are often overmoist and thus have bad aerial condition; many are overacid and do not have enough of mineral organic substances for the plants.

During the last 20-30 years farming in our country moved up to 70-71° north latitude and in some localities reached the shores of arctic seas.

Some kolkhozes near the city of Murmansk harvested 185c of potatoes, 647 c of cabbage, and 626.6c of turnips per ha, and some of the leading growers even harvested 300-320c. of potatoes per ha in 1953. In Iakutskoi republic in some regions up to 475c of corn for silage per ha were harvested.

A 788

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The botanists of former years had an erroneous "theory" that the plants cannot absorb moisture from a soil with low temperature. Michurin's science teaches that under the influence of the environment the organisms are able to change, adapt themselves to new conditions, and these newly acquired changes become fixed in their progeny. And thus, if a plant was influenced by cold the next generations will require cold. Experiments have shown this to be true.

It is only during the last decades that scientists began to study the life of plants in the Extreme North. Michurin's motto: "We cannot expect any favors from nature; our problem is to take them from her", is especially needed to be applied by agricultural workers of the North. The real work of moving agriculture further into the Extreme North is in rebuilding the nature of plants; this will change the character of their development, and will determine differently many physiological processes.

The present pamphlet speaks about how the plants adapt themselves to life under severe conditions of the ever cold soils of the North, which lay over eternal congelation.

Roots of plants growing in the North.

The roots of plants first of all touch the cold soil and experience the influence of low temperatures.

In our literature, until lately, there was an opinion that the roots of almost all plants, without exception, which grow on soils which lay over eternal congelation, develop only in the uppermost layers of soil, which are better heated. There is a widespread idea that the roots, even before reaching the perpetually frozen ground, are fatally influenced by the extremely low temperatures, and the metabolic activity of the roots is oppressed.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The roots, as it is known, not only anchor the plants to the soil and help them to remain in a vertical position, but also serve to intake water from the soil and absorb mineral nutritive substances for the plants. Besides that, as it was established by latest research, in the roots of plants certain complex organic substances are formed, which are of great importance to the life of the plant organism. Finally, under the leadership of the Academican A. L. Kursanov, the co-workers of the Institute of Physiology of Plants AN USSR, imeni K. A. Timiriazeva, have ascertained that the roots can also obtain carbon in the form of carbon dioxide, which is one of the basic elements entering the composition of plants (on the average about 45% of carbon is contained in the dry substance of plants). Before these researches the Soviet scientists thought that plants are nourished with carbon only from the air.

Special experiments with oats were undertaken in order to determine what is the ultimate low temperature of the soil which the roots are able to stand, and how deep can they penetrate into the cold layers of soil. Oats were grown in vessels which were partly immersed into a cooler in such a way, that the lower 10-15 cm of the soil became frozen. Upwards the temperature of the soil gradually increased. In these experiments it was found, that the ends of the roots of oats have penetrated into the layers of soil, where the temperature was all the time about 0.2-0.5° above zero.

It is quite remarkable that the yields of oats in these experiments were practically identical as in those vessels which were cooled, and in those which were not cooled from below. The outlay of water for transpiration was identical for both cases.

The fact that the roots of a cultivated grain penetrated into the soil with such low temperature was unexpected; it changed all the former ideas

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

in this respect. This fact refuted the assertion that in Iakutiia even individual roots of spring wheat do not go far into the ground if the temperature is below 5° of warmth. This fact also contradicted the assertion that the layers of soil with temperatures from 0 to 5° of heat "are a physiologically inaccessible zone for plants".

Besides the experiments, which were done under artificial conditions in many of our northern regions, many researches on roots of wild and of cultivated plants were made under natural conditions. Usually the roots were dug out at the end of the summer; at that time they achieve their greatest development because the soils are the most strongly warmed, and the limit of the upper surface of the soil's congelation dips almost to its lower boundary. For these researches places were usually chosen where at the end of summer these boundaries were retained at a depth of 50-60 cm.

As a result of these mass researches it was possible to ascertain, that the roots of trees - birch, fir, cedar, larch - truly are concentrated in the upper layers of soil and their endings, as a rule, were not found deeper than 40-45 cm from the surface. Roots of bushes, both large and small varieties, such as wild rosemary, bog bilberry, whortleberry, and others, do not go deeper than 20-25 cm from the surface. But the roots of these plants and trees spread very widely broadwise. Very often the roots of a bilberry bush spread out 8-10 meters from the stem.

But quite another picture was found when the researchers studied the grass plants. The roots of the common beach grass were discovered at the very surface of congelation. The roots of cloudberry, of some varieties of sedges and meadow horsetail were found within the layers of the frozen ground. In some cases living roots of horsetail were found as deep as 90 cm within the frozen ground, whereas the thickness of the thawed layer of soil

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

during the summer period did not exceed 60-65 cm. The temperature of the frozen ground was around 0.5° below zero. This was not an occasional fact and it indicates that roots of some species of northern plants have an ability to enter the frozen layers of soil where temperature reaches 1° of cold.

Observations of the roots, under a microscope which were taken from the frozen ground on different dates during the summer, helped to ascertain that the processes of growth are not fully inhibited at small negative temperatures. Thus, a root which was within the frozen ground all summer long, with temperatures 0.5-1° below zero, has stored starch granules in its cells between spring and fall, which are, as it is known, stocks of nutrients, laid away for future use. Consequently, the process of metabolism continues in the roots which are within the frozen ground. Besides this, dividing cells were found in the growing endings of roots (in meristem), taken from the frozen ground. Thus, basing oneself on all this available research material one can divide the plants into groups with three types of roots, according to the degree of their dipping into the cold layers of soil.

The first group - most trees and bushes which have roots that rarely penetrate the peat-moss covering of the soil; their usual depth is 25-35 cm. They usually spread broadwise very widely.

The second group - its main representative are beach grass and dog rose; their roots penetrate the peat-moss covering and they begin to develop in the covering's mineral layers, almost reaching the surface of the frozen ground with their root endings.

The third group, to which belong the cloudberry, are some varieties of sedges and the meadow horsetail. Their roots develop in the thawed part of the soil and can be found during the whole summer period in the frozen layers of the soil.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

These researches were, as a rule, conducted in regions with the severest temperature condition of the soil, where the eternal congelation is very near to the surface of the soil. On sections where the frozen ground receded deeper - the roots of the first group of plants penetrated deeper into the ground. Thus, the low temperature forces the roots of some plants to spread in the uppermost layers of soil. Other species, in their historical development, gradually become adapted to the cold soil to a degree where their roots live and continue their metabolism even in the frozen ground.

The general character of development and the degree of penetration of underground organs of barley, oats, spring wheat and winter rye, as well as corn in the North are not much different from those in central and southern regions of the country. Thus in one of the northern regions the endings of barley roots were found at a depth of 123 cm, of oats at 105, spring wheat at 103, and of winter rye at 138 cm.

A distinguishing peculiarity of plant roots, grown in cold soils of the North, is their marked thickening as they penetrate deeper into the colder layers of the soil, as well as a diminishing ramosity. Observations under a microscope showed that this thickening was produced by an enlargement of cells, without any changes in the interrelationship among individual tissues. This expansion of individual cells at low temperatures is conditioned by the absence of certain complex organic substances, which are developed by roots. Formation of these substances is deferred by an absence of heat.

Research into the root system of potatoes, turnips, radishes, cabbage, onions, tomatoes, and other vegetables, which were cultivated on cold soils showed almost the same picture as the roots of grain plants. The underground organs of vegetable crops in the North penetrate almost to the same depth as in central regions of the country. As they penetrate deeper the

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

roots become thicker and less ramose. The roots of cabbage, turnips, and rutabaga penetrate as deep as 60-80 cm; in these limits on plowed fields of the North there is no great difference in temperature in the layers of the soil. The same can be said about onions, whose roots are not found deeper than 35-40 cm. Thus, one may conclude that temperature does not pose any insurmountable obstacles for vegetable growing in the Extreme North.

It was found that among the studied varieties of potatoes, the roots of local ones usually penetrated deeper into the ground than those which were newly imported, and they developed faster. As a rule, potato roots do not penetrate deeper than 70 cm in the Extreme North. Local varieties showed higher yields.

Underground organs of grasses, on both the planted and natural meadows, penetrate to a depth of 130-140 cm. In planted grasses the vigor of roots becomes apparent toward the third year of life.

Thus, from these observations, it is seen that the root system of all the basic cultivated plants, which are moved to the Extreme North, have a good ability to adapt themselves to cold soils, possess wide variability and plasticity. Some of the plants adapted themselves by spreading their roots broadwise, others developed an ability to penetrate much deeper into the cold soil.

The next question is whether the roots can normally perform their functions, whether they can obtain from the cold, and even from the frozen soil, all that is necessary for a normal growth and development of the plant. This important question must be subdivided into two: 1) can the roots utilize the moisture from a cold and frozen ground, and 2) can the roots of plants utilize the nutrients from a cold and frozen ground.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The way in which plants obtain water from cold soils.

For a normal functioning every plant needs a large amount of moisture. The combined large surface of leaves, coming into contact with the air, and becoming heated by sun's rays, continuously evaporates moisture. This process is called transpiration. The plants must develop a very large leaf surface so that a sufficient amount of air, as well as of carbon gas and light would constantly flow into the cells of their flesh.

In order to have an idea how much water a plant is expending during one summer some figures are given. The ordinary grain crops evaporate from 300 to 400 kg of water to form each kg of the dry substance of the yield. If one remembers that in many regions of the Extreme North there is only about 200-250 mm of precipitation per year, it becomes evident how careful one needs to be to preserve the moisture in the soil.

Up to a recent time in scientific works, one met indications that low temperature impedes the absorption of moisture by the root system from the soil. This was based on old observations by German physiologists of plants, Saks and Chilman. In 1898 the German botanist, Shimper, formulated a theory on physiological dryness of cold soils. The essence of this theory was that all the plants, developing on cold, even moist, soils, inevitably suffer from a deficiency of moisture.

Advocators of this conception base themselves on Saks' experiments, which were conducted in the middle of last century with heat-loving plants-tobacco and pumpkin. The vessels, in which tobacco and pumpkin were cultivated, were surrounded with ice and the plants wilted. Meanwhile this same Saks conducted experiments with cabbage and found out that its roots could absorb enough water for all its needs even at zero temperature in the soil.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

This only shows that diverse plants react differently to the low temperature of the ground.

In many of the latest botanical works multiple facts of variability and of adaptability of plants under the influence of the environment are presented and enumerated. In reference to northern plants usually more than a dozen peculiarities in their composition and in their physiological activity, which were acquired under the influence of the peculiar environment, are enumerated. For instance, it is noted that there is an almost total lack of annual plants, and this is explained by a short vegetative period, which does not permit the plants to sufficiently develop and bear ripe seeds. Further on it is noted, that many plants of the North produce viviparous forms, instead of seeds, when the normal flowers or spikes are substituted by breeding buds or bulbs, which germinate and become green yet on the plant. Among the northern plants there are many evergreens; biologically this is explained by the fact that the assimilating apparatus of plants starts its work immediately after the thawing of snow, without loosing any of the warm time for the development of the green assimilating surface.

It is noted, that the plants in the Extreme North are usually stocky; many have a creeping form; they have many adaptation, which safeguard them from strong light (covered with fuzz, with wax, abundance of the red pigment, and so on). All these peculiarities are mentioned only for the aboveground parts of plants, but when it comes to the root system right away the old "theory" of physiological dryness is brought out. For some unexplained reason, the root system is denied the ability to adapt itself and change under the influence of environment as do the above ground parts.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

In the light of modern scientific ideas the calculation of the amount of water, which was expended by a plant for transpiration, in 24 hrs can give a general idea on the provision of a plant with water and on the condition of its water economy. With a sufficient moisture content in the soil and in the absence of causes, which hinder normal water absorption, the daily process of transpiration is expressed by a one-peak curve, with a maximum at about midday.

Observations of transpiration in various regions of the North shown a rather high level of evaporation of moisture by the leaves of both wild and cultivated plants. A high level of transpiration, at a comparatively low temperature of the soil, does not offer any basis for talking about a presence of difficulties for a normal provision of plants with water. A two-peak curve of the daily process of transpiration, which is characteristic for insufficient supply of plants with water, was not found in the cited researches. Thus, data of observations do not show any difficulties of absorption of water by plants.

Many researchers correctly think that the water balance of a plant, that is the amount of water entering the plant and expended by it during a certain period of time, is a characteristic of the plant's water economy.

There is a continuous process going on in the plants. The leaves are continuously loosing water through evaporation. Then the suction power of the leaves increases, and water is suchked into the leaves from the soil through the conveying system of the plant.

Thus the content of water in the leaves is a resultant indicator of the water balance in plants for a certain period of time. When, during 24 hrs, a continuous evaluation of the content of water in a plant is conducted, then a state of the water balance for one day is obtained; and according to that it

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

is possible to judge how the roots provide an intake of water in exchange for the water expended during evaporation.

Transpiration usually falls almost to zero during night hours. Maximum content of water in leaves is seen, as a rule, in the pre-dawn hours.

Decrease of water content in leaves during day time is a normal phenomenon. But if during the night the leaves do not have restored to them the amount of water which they had the previous morning, this then shows a break in the water balance of the plant.

A large amount of observations of the water balance in plants, conducted in northern regions, show that the greatest fall of the water content in leaves, during hot hours of the day, does not exceed 10-12%. This is normal and does not show any breaks in the water condition of plants. Towards morning the content of water is usually fully restored.

In sedges and horsetails, the roots of which are found in frozen layers of ground, the content of water in leaves during a 24 hr period dropped very little. For hedges it did not surpass 7%, and for horsetail - 5%.

Thus, judging from this indicator, one cannot also think that there are some difficulties which hamper the absorption of water by the roots from cold soils.

It is known that when there is insufficient amount of moisture the plants keep their stomata closed for a longer time. Observations of stomata in plants of the North did not give any such basis for conclusions about insufficiency of water supply.

From many experiments conducted by physiologists, it is well known, that roots of plants in dry localities differ by their greater sucking power, than plants, which are growing in places well supplied with water. The mass experiments, conducted to obtain information on this indicator in different plants of the North, show that the sucking power in these plants is somewhat

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

lower than in plants of dry localities, but higher than in many of the swampy and meadow plants of central regions of the country. It was disclosed, that the sucking powers of the roots of one and the same species of plants, which are growing on soils of different temperatures, are increasing with the lowering of temperature in the zone of roots. This, probably, is one of the proofs about the ability to adapt themselves to a cold soil. Greater sucking abilities of the roots, growing in cold soils help the plants to retain under these conditions a necessary level in the water supply.

Thus, all the indicators, which are adapted by the physiology of the plants, and which characterize the water condition, show that the existence of plants on cold soils does not necessarily lead to a disturbance in their water supply.

In addition to observations of the water condition in plants of the North in nature, during the last years many accurate experiments under artificial conditions were conducted with a keeping of definite low temperatures in the root zone. During these experiments it was fully possible to keep accounts of the outlay and the intake of water by plants, which were grown in a cold soil, as well as in control plants, which were grown without chilling.

In one of such experiments plants of barley were grown up to the heading stage in a warmed soil, and after that it was cooled to 1-2° above zero. Other plants, on the contrary were grown before the heading stage in a cold soil, and later in a warm one. Every day the amount of water spent for transpiration was calculated for all the plants. Results are given in table 1.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 1.

Transpiration in barley plants with a periodic chilling of roots.

Variants	Transpiration, according to 10-day periods (in cubic cm)								
	I	II	III	IV	V	VI	VII	VIII	Total
All the time in the heat	-	927	1972	2155	2062	1298	1656	765	10815
In the heat up to heading stage, then in the cold	-	1186	2865	3106	2537	1386	1399	819	13297
In the cold up to heading stage, then in the heat	-	268	540	687	843	638	795	348	4117
All the time in the cold	-	258	549	718	873	649	838	421	4306

Footnote: Underlined figures show those ten-day periods when the vessels were chilled.

Of most interest in this table is the absence of any substantial jump in the intensity of transpiration in plants when these vessels were carried from cold into the heat and vice versa. Thus this experiment also showed that the former assertion that the plants cannot normally absorb water from cold soils is not correct.

From all the experiments it was seen that the influence of cold at the early stages is detrimental to the plant's life. The earlier and the longer the root system is chilled, the more that is reflected in the amount of water evaporated during the whole period, as well as on the growth of the plant, on the yield and quality of the seed.

From the table it is seen, that cooling of roots during the period from planting to the heading stage produced almost the same transpiration as in those plants which were kept in the cold all the time. Thus the low temperature in the zone of roots is not indifferent to the growing plants. It produces certain changes, which influence all the following development of the plants.

The lagging in growth and in development of plants, cultivated in Extreme North, can be explained by some difficulties in the inflow and in the utilization by plants of certain nutrients.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Root feeding of plants in cold soils.

Academician I. G. Eikhfel'd and his co-workers in the Khibinskaia Experiment Station, even in their first experiments on utilization of fertilizers in the Extreme North, have ascertained that it is absolutely necessary to introduce high doses of organic fertilizers every year. It was also found that a joint introduction of organic and mineral fertilizers adds to their effectiveness.

Practical data has led to a thought that under conditions of Extreme North, the plants need a far higher concentration of nutrients in the soil than in warmer climates. This assumption was tested in special experiments and was confirmed. It appears that at low temperatures in the soil the effectiveness of fertilizers is lowered more than twice. Most often in the soil there is lack of nitrogen, phosphorus and potassium. These three elements are usually introduced as mineral fertilizers; they also are to be found in manure.

Special experiments have shown that phosphorus and potassium are utilized by plant roots almost as easily from cold soils as from warm ones. A considerable decrease in weight of plants and their general oppression is noted in those cases when the plant gets its nitrogen food from a cold soil. Thus, the unsatisfactory growth of plants on cold soils depends primarily on difficulties in utilizing nitrogen under such conditions.

The nature of this phenomenon has not yet been made quite clear. But the chemical analyses of plants permit to suppose that disturbance is not in the absorption of nitrogenous food from the soil, but in its further utilization when complex organic substances are formed during the process of growth.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

In particular it was found out that in the serum of plants, which grow in cold soils, there is a far smaller amount of amino acids, out of which the protein molecule is composed.

Although it is the work of the future to solve all the above problems, nevertheless it is possible now to take some measures which will help northern agriculture.

One of these is the leaf-feeding of plants in addition to regular fertilization of soils.

By-passing the cold soil, the leaves are periodically sprayed with a weak solution of ammonium nitrate or any other nitrogen fertilizer. This has other advantages. There is no wasteful outlay of fertilizers, which are absorbed by the soil. The second advantage is that leaf-feeding can be conducted at the end of the vegetative period on continuous crops, when the rows of plants have joined together. Of late, this type of fertilizing is done from airplanes. The third advantage is that with this type of fertilizing it is possible to dose the feeding according to the stage of the plants' development, and thus they react faster to the supplementary feeding.

Already the first experiments of leaf-feeding in the Extreme North have shown good results. The plants were sprayed once in three days with 1.0% solution of ammonium nitrate. Additional yield of potatoes was 20%, and of cabbage - 87%. Later on this measure was tested on several of the Extreme North experiment stations and everywhere gave good yields; increases were from 12 to 36%.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

At the present time this method of supplementary feeding is practiced also on production levels, as it is reported from the Igarka city, from Beregovo, and from other localities in the Extreme North.

In Iakutiia, on Tiksinskii base, the yields of cabbage increased to 29%, and the harvest of fodder cabbage was boosted almost twice. (400 c per ha against 215 c on control plantings).

For private individuals, who grow vegetables in the Extreme North, it is very easy once every 3-4 days, when watering their vegetable gardens, to add about a spoon of saltpeter to a watering can, and thus supplementaly feed the plants while watering them, and overcome a difficulty which hampers the growth of plants on cold soils.

Growth and development of plants in cold soils.

Development of a theory of a phasic development of plants by the Academician T. D. Lysenko is a great achievement of the Soviet agrobiological science.

At the present time two stages in the development of plants are fairly accuratedly established: the stage of vernalization and the light stage.

For the first stage, of vernalization, temperature is the basic condition, which determines the possibility of development. Light is a deciding factor in the whole complex of outside conditions for the passage of the second stage - that of the light. But these are not the only constituents on which the passing of a given stage of development depends. A whole complex of factors is needed at each stage. For instance, if the seeds are fully deprived of moisture, of air, and so on, then even the most favorable temperature conditions will not permit them to pass through the vernalization stage. Many experiments, conducted by our scientists have shown that passage of the

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

light phase is retarded by insufficiently high temperature.

Requirements of certain outside conditions or their combination at each stage of development have been worked out in plants under the influence of that environment in which the plant was cultivated in the course of many generations. That is why the duration of each stage in plants, and in their varieties of different origin, are in conformity with the natural conditions of that region where this plant or its independent varieties were formed. This case is in full accordance with Michurin's teachings about the molding role of the environment. Under the influence of unusual conditions (especially of lengthy ones), in the environment, a development of organisms proceeds differently and, consequently, a more or less new living body, with different characteristics and a different heredity is formed.

This theory of a phasic development helps to understand and explains the peculiarities of growth and development of plants under conditions of the Extreme North with its cold soils. In the spring and at the beginning of summer, when the soils are not yet well heated through, the plants develop very slowly, while during the second half of the summer, development of cultivated crops proceeds quite fast. This phenomenon with cultivated plants which are but recently introduced to the North is quite explicable. For cultivated crops the influence of cold soils tells in a retarded passage of separate stages of development as well as in the structure of the yield.

This was also confirmed by many experiments with artificial chilling of roots of barley and oats. And it attests to a great importance of heat conditions in the soil, especially at the beginning of vegetation, and to a great role of this factor in the formation of the crop.

A complex of agromeasures, which received a name of "a heat melioration of the soil" is especially important for agriculture of the Extreme

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

North. The nature of these measures is in formation of such conditions, which will prevent a penetration of the winter cold into the soil. This is achieved by snow accumulations. A layer of snow of 30-40 cm, which has been additionally accumulated on the fields, will protect the soil from chilling very considerably. But one should also make a provision for thawing out this snow in spring as quickly as possible so as not to shorten the vegetative period for plants, which already is very short. For this purpose a dark powder is strewn over the snow so as to make it dark in color. (It is known that black absorbs the sun's rays, while white reflects them). Coal dust, sand, even ashes are used as this dark powder. It is sufficient to spread this darkening agent in spring in an amount of 25-30 g per square meter in order to hasten the thawing of snow by 10-12 days.

This was ascertained by experiments on Kamchatka, where the vegetative period was lengthened 12-14 days. Other experiment stations confirmed this too.

The story of growth and development of local wild plants is quite different and it only confirms the theory that they have adapted themselves to the conditions of the Extreme North.

This same theory of a phasic development points to the fact that by means of cultivation of plants for several generations one can obtain forms which will be adapted to these conditions. A three-year experiment with barley fully confirmed these theoretical assumptions. The barley plants from generation to generation were cultivated at a temperature, in the root zone, in the limits of 1-2° above zero. Results of this experiment are shown in table 2.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 2.

Weight of barley plants, when cultivated on cold soil

Variants	Weight of 10 plants (in g)	
	Total weight	Weight of spikes
I generation	15.6	6.9
II generation	22.1	9.5
III generation	30.9	12.4
Control (without chilling)	63.1	36.1

As seen from the table, after 3 generations the weight of plants as well as of spikes increased twice.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Trans. A-789
(In full)
vg/A

A
789

Gudoshchnikova, I. V., and Lebedev, D. V.

Diskussiia po obshchim voprosam biologii v Pol'she.

[Discussion of general biological problems in Poland].

Botanicheskii Zhurnal, vol. 41, no. 3, p.445-449. Mar. 1956. 461 R923

(In Russian)

The Department of the Biological Sciences of the Polish Academy of Sciences has a Committee on Evolution. On May 9, 1955 this Committee met in a plenary session which was reported in the "Kosmos" zhurnal (Kosmos, ser. A, Biologia, r. 4, z. 4 (15), 1955 : 569-582).

We shall acquaint briefly the readers of "Botanicheskii Zhurnal" with the interesting discussion that took place.

The discussion which concerned the present state of the ideological struggle in the field of biology in Poland was opened by Prof. K. Petrusevich. His address covered the following propositions.

In Poland, in the years 1948-1952, significant work was done to acquaint [botanists] with Michurin's genetics, and later also with the first formulations of creative Darwinism. The Committee on Evolution played an important role in these endeavors. As a result, scientific life became more active, theoretical work increased, and specific, concrete investigations were undertaken in one place or another. Nonetheless, it must be frankly admitted that, regardless of the efforts of a number of scientists, it was impossible to avoid making many mistakes. The most important ones of these were: irrational declarations and the ensuing abstraction, dogmatism and aimless administration. Because of

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

these distortions, the results obtained were not in keeping with the efforts expended. The consequences of these distortions still manifest themselves on the state of our native biology. We must make it distinctly clear to ourselves what our errors are, not only for the sake of preventing their repetition, but also - and more important - in order to removed the consequences. Hence, it is possible that I exaggerate a little when I characterize our shortcomings. The discussion that will now take place will have to supplement, deepen and rectify the propositions which I have introduced.

One of our most important mistakes, K. Petrusevich continued, was the attempt of our Polish botanists to put a mark of equality between the laws of Michurin's genetics and creative Darwinism, on the one hand, and the laws of dialectic materialism, on the other hand. We failed to account for the fact that a translation of the total concept of dialectic materialism into the language of biology has not yet been accomplished, but it must be accomplished, and chiefly by biologists, perhaps, with the assistance of philosophers. A consideration of the laws of creative Darwinism as principles of dialectic materialism, the veracity of which has been confirmed by the entire history of society, and which cannot be a subject of discussion, is not only premature, but also unfounded. From this emanated the dogmatization of the laws of Soviet creative Darwinism and of their uncritical acceptance, the idea of their absolutism and the erection of speculative structures on this basis.

The other characteristic feature in our activities was the fact that creative Darwinism and Michurin's genetics did not develop normally in our country, did not grow in Poland on their own soil, from our own scientific investigations, but were transmitted to us from the Soviet Union. At the same time it is known that their sources existed also in Poland, but we did not

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

know how to develop them.

The third characteristic feature ensued from the fact that Michurin's biology and creative Darwinism were transmitted to us at the moment of their victory in the Soviet Union. This often prompted us to proclain them, but not to develop them. We, naturally, did make attempts to develop them and to documentize the laws of Michurin's genetics and creative Darwinism, but the predominant tone favored proclamation and not evidence or conviction. The absence of one's own concrete data led to unscientical dogmatism. We often forgot that generalization and a general concept are not the same thing, that these are not only distinct concepts, but are also contradictory. Superficiality, frequently found in our practice, was further aggravated by the fact that we, who knew too little about formal genetics and had not followed its changes and development, were criticizing the metaphysical theories of formal genetics. Hence we struggled repeatedly with "Wind mills", with what is no longer factual in biology, and failed to expose the things that up to now threaten the further development of science. This led more than once to a superficial, unscientific condemnation of the opinions of some investigators and to dogmatic apologizing for the opinions of others. Worse than that - in the heat of battle, we treated whole provinces of science with contempt, which led to the neglect of some scientific trends, for instance, cytology.

As a result of this, we did not succeed in surrounding ourselves with wide circles of scientific workers. We felt that time was favoring us and when we encountered difficulties in attracting scientists to Michurin's biology, we put ourselves in command and even resorted to administrative pressure. The atmosphere of distrust and even insincerity that was created, was not conducive to the development of science and deserved to be censured. Many scientists were reluctant to express their views if they differed

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

from those which, apparently, had been recognized officially as authentic. These drawbacks were not limited to the year 1952. The 2nd Congress and 3rd Plenum of the Central Committee of our Party had passed; dogmatism and aimless administration in public life had been condemned at these meetings, yet we - the active body of biologists - had drawn no conclusions from them, had not tried to convey their views to biology, and had not translated the instructions which we had received from the political leadership into the language of the biological science. The biologists themselves, naturally, had to draw some conclusions from the general political instructions for their work. Since this, however, proceeded unorganized [stikhiino] and again without discussion, these conclusions were sometimes wrong. Thus, for example, the Soviet discussion of the formation of species and other biological problems was interpreted incorrectly. Criticism turned into a dogmatic (except from the opposite side) negation of Michurin's genetics and creative Darwinism on the whole under the slogan [losung] of return to formal genetics and to neo-Darwinism.

Instead of acknowledging its mistakes frankly and trying to rectify them, the Committee on Evolution took its time, became disoriented, and its activity declined. As a result there developed a situation in biology that could be characterized as follows:

1) the development of the new biology, which was inclined to lean on dialectic materialism, was delayed and this fact had an acute effect on Michurin's genetics;

2) this crisis passed in an atmosphere of a general "conspiracy of silence".

K. Petrusevich illustrated these topics by analyzing the contents of biological and agricultural journals for 1954-1955: "Kosmos", "Postepy

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Nauk Rolniczych", "Roczniki Nauk Rolniczych" and "Acta Agrobotanica", in which articles devoted to problems of Michurin's genetic and creative Darwinism are almost completely absent.

The delay in the development of the newbiology is witnessed also by fear of publicity [obobshchenii] and underestimation of the role played by theory. There appeared the elogan: "Let us gather facts, there is plenty of time for synthesis." This was the reaction to the abstraction and the declarations of the preceeding period. A tradition of this type is, however, harmful. Whether or not investigations of Michurin's genetics were conducted in Poland insufficiently, or not at all, it does not mean that we must not speak or write about topics which are the center of a sharp dispute. Concrete investigations form the basis of development of every science and of the ideological struggle within it. Nonetheless, general biological problems must be discussed and scientific workers must live them and be aglow with them.

A more dangerous phenomenon is the tendency to destroy the unity of theory and practice, to walk out on problems connected with practice for the sake of "pure science". This is so much the more dangerous since Poland has no strong traditional bond between science and practice. Plant culture and animal husbandry were built in our country chiefly on an empirical basis.

The bond between theory and practice, which had begun hesitantly to establish itself under th influence of wide-spread propaganda waged for the new biology, was beginning to weaken. Thus, at the congress of hydrobiologists in Vrotslava the accent was on "pure science", on "purely hydrobiological subjects. Sometimes the tendency for "pure science" is covered up with the label of struggling with practitioner-ism. It is obvious that to reduce science to pure utilitarianism is also extremely harmful, and

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

thus we are compelled to fight on two fronts.

In an ideological struggle, the more debatable problems must not be avoided. The front on which we are attacked the most is that of Michurin's genetics, and here we must take up the fight. It is impossible to be silent about this, to keep on waiting, or to turn to other, more tranquil spheres of biology.

The Committee on Evolution must destroy the "conspiracy of silence" which will lead to nothing good, which will bring science to a dead-lock.

Twenty one men took part in the discussion (two of them spoke twice). Their speaches supplemented considerably the propositions voiced by the reporter. We omit the speeches which were devoted wholly to problems of Pavlov's teaching, to the state of research work in the realm of animal husbandry, and to other non-botanical problems. They included those of Prof. Chai, Dr. Shenbert, lecturer Kelanovna, Magister [qualified teacher] Pozharskaia, and Prof. Biretskaia.

Prof. Ber said that for a number of years biology had been based not on facts, but on general premises with the facts being adapted to these premises. Vague concepts of the gene theory were, for reasons of methodology, contrasted with a no less vague concept of metabolism. The biological situation, however, is not so bad as the reporter deems it to be. The propositions of science cannot be measured by the number of articles written. They are few, but their quality has improved; more attention is paid to facts, less to general discussions.

Prof. Biretskii pointed out that such basic laws of Michurinism as the idea of unity between organism and environment, of the completeness of the organism and a number of others are not questioned. Some theoretical doubts had arisen in explanations of the ways of evolution. Our failure to unite

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

scientific workers, to create research centers for the experimental development of Michurinism in Poland was a big drawback, particularly our inability to create a center for investigations of genetic selection. It is impossible to agree that the developmental cord of the new biology in Poland has been broken. It is true that wavering is felt among people whose work is connected with Michurin's teaching, and it is too bad that we have made no effort to analyse this wavering. A great deal would have been cleared up on the basis of facts and by means of critical discussion.

Prof. Skovron stated that to establish Michurinism firmly it must be based on facts. The most important proposition is the recognition of heredity of acquired characteristics. Prof. Petrusevich asserted that we are struggling with "wind mills", with opinions that are twenty years old. Yet no essential changes have occurred in formal genetics, judging from the last works of Mueller and others. We must define our attitude toward the article written by V. V. Skripchinskii' (Botanicheskii Zhurnal, No. 1, 1955) who defends the position of a solely undetermined variability.

Prof. Gol'finder-Kunitskii dwelt on defects in the training of young specialists. He said they often cover up their ignorance with slogans. Biologists must be taught methods of conducting biological discussions - general conclusions must be supported by experimental material. Many propositions of Michurin's biology were ill-defined and inaccurately formulated. It is impossible to take a position of this sort - we must defend Michurin's legacy. Michurinism is one of many ideologically acceptable working hypotheses the confirmation of which we shall seek in our investigations.

Magister Kokhan'skii emphasized that the weakness of biologists is due to the dearth of facts produced by biology in confirmation of topics of dialectic materialism. It was largely a case of restricting ourselves to facts

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

which confirmed some well-known law, without paying attention to those which did not fully correspond to the theory. Thus, for example, was the case with the works on Mendel's quantitative relations [otnosheniiam]. The task which biologists as well as philosophers undertook was notthe development of biology or philosophy, but rather the popularization of generalities. This was accompanied by aimless administration. Some articles asserted that whenever the general prerequisites a greed with dialectic materialism, then it is wrong to come forth with facts which demand that the prerequisites be altered. With an attitude of such apriority philosophy has usurped the right to solve concrete scientific problems.

Prof. Raabe declared that in recent years many mistakes have been permitted to infiltrate Polish biology due to the absence of criticism and a fideist attitude toward some scientists. We have, for instance, accepted in good faith the theories of Bosh'ian, Lepeshinskaia and Lysenko which now have toppled over one after the other like little houses of cards. The trend to turn to facts, the rejection of conceptions not confirmed by facts should be welcomed. We are against factology, but if a young scientists begins by drawing general conclusions, then his scientific career is ended. Whether or not we can defend Michurinism depends on whether or not Michurinism is right. If it will prove to be right, then it will speak in its own defense. Our work is investigation; modern biology - dialectic and materialistic - will grow only on the basis of investigations.

Magister Kuzhnitskii said that creative Darwinism had frequently been presented in Poland in the form of a catechism. The influence which this circumstance exerted upon young specialists depended on their instructors and on the directors of scientific institutes. Some institutes are headed by personages who maintain a non-critical attitude toward siputable problems,

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

and in those institutes some young specialists limit themselves to the proclamation of slogans.

Prof. Iachevskii noted that the cardinal error in the activities of the Committee on Evolution for the past 5 years had been its breaking away from the work of scientific institutes which had been continuing as of old. Young scientists must not commence their activities from general conclusions. The most concrete investigations contain popular elements and we must help young specialists to find them. The break between theory and practice should not be exaggerated - this was not done even at the Congress of Hydrobiologists at Vrotslava.

Prof. Tarvid appraised Prof. Petrusevich's report as excessively pessimistic. The break in the development of biology is only a superfical one. We are accustomed to making evaluations too quickly. Here, for example, disparaging remarks were made about Lysenko, while a series of Polish investigations have corroborated his principles.

Prof. Makarevich said that she expected concrete help from the present discussion in the sphere of scientific work as well as in teaching. An explanation of Michurin's genetics is handicapped by the fact that youth comes even from elementary schools with slogans and with vulgarized ideas. [Begin p.448] Under such circumstances one is tempted to explain genetics as an abstract, but externally harmonious system. Yet, every one who has done experimental work in the field of formal genetics knows that this would mean a return to a stage passed long since. Formal genetics must be studied carefully to determine what the main source of its influence is - it was capable of producing answers, even if they were wrong, to questions which Michurin's genetics has been unable to answer up to now. One can agree that Michurin's genetics is a working hypothesis on the premise that

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

this hypothesis promulgates data of agricultural practice. It would be erroneous to consider practice as an absolute criterion of the authenticity of Michurin's genetics, nonetheless, experiments of the latter must not be separated from agricultural practices. It is very difficult to conduct experiments that will confirm scientifically the veracity of conclusions drawn from practical operations. This is not the beaten path in science, and the Committee on Evolution must play here an important role. It is essential that biological problems be combined with those of agriculture much more closely than heretofore.

Magister Golian did not agree with the reporters evaluation of the state of evolutionary study in Poland. We do not have works on the scale of Darwin's works, but we do have very many concrete investigations based on local material. Unfortunately, these investigations were not treated with care, were not promoted, and were discontinued. As far as philosophy is concerned, scientists turned away from it, because there was very little of real philosophy, since it had been replaced by slogans.

Magister Grenbetskii dwelt on ideological confusion among young scientific staff members. The essence of the matter is chiefly the failure to draw a line between hypothesis and theory. All of them were presented in the form of theory. Such, for instance, was the case with the explanation of evolutionary causes. Today, however, a reversed picture is observed - everything is revealed by hypothesis. All, except those who come forward as enemies of Michurinism and with whom a struggle must be waged, are disoriented people. The position of the philosopher was not conducive to the elimination of disorientation as they were dealing chiefly with interpreting.

Prof. Mikhailov (editor of "Kosmos") pointed out that the discussion

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

was supposed to answer three questions: 1) was the propaganda of creative Darwinism necessary? 2) what errors were permitted to occur? 3) what conclusions must the Committee on Evolution draw for the future? On the whole, the discussion has answered the first question in the affirmative, although Prof. Raabe did not agree with this. The second question received a number of answers - notice was taken of excesses in declarations, absence of criticism, unilateralism, and many others. As far as the third question is concerned, it must be remembered that the work of the Committee on Evolution can exert only a limited influence upon the condition of our native biology which depends on many factors. Discussion in the USSR, the Lysenko discussion, has to a high degree influenced the mood and the work of our Committee. This discussion provoked the "conspiracy of silence". We tried to destroy this "conspiracy" by publishing an article in the "Kosmos" to which we could add nothing more even now. This question is much more complicated and profound than Prof. Raabe imagined when he spoke of people of "suspicious behavior" and of theories which have "toppled over like houses made of cards". During our recent stay in the USSR we saw how the above mentioned Bosh'ian and the people who are refuting his theory were working in the same building. The theories have not toppled and will not topple like houses made of cards - it was manopoly in science that has toppled.

What is Michurinism? He who recognizes the unity of organism and environment and the consequences ensuing therefrom (for example, inheritance of acquired characteristics), he who recognizes the unity of theory and practice and the outcome of this principle, defends the position of Michurinism, of dialectic materialism. If defense of Michurinism implies strife with erroneous theories as well as creative development of the bio-

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

logical thought underlying Michurinism based on experiment and practice, then this will be our task.

Prof. Listovskii declared that the essential element in the development of science is doubt and criticism. Therefore, no attempt should be made to obstruct free discussion of biological problems. Scientific workers are cognizant of the bond between theory and practice and any talk about scientists breaking away from practice is unfounded, on the contrary, one could sooner speak of a dangerous empirism in the agricultural and medical sciences. At the same time it is necessary to develop investigations which have no direct bearing on practical problems, so as not to delay the progress of science.

Theory, from my point of view, is the more reasonable hypothesis proceeding from facts known at a given stage. Some 20 years ago, it seemed to me that the theory of phasic development, which falls in my sphere of interests, was the more reasonable and, hence, the more creative hypothesis on the basis of which the theory of ontogenesis can be developed. Nonetheless, at present it is clear that in Lysenko's formulation this theory is erroneous - it has failed to create a foundation for the further development of science. There are only three principles left of it: 1) the irreversibility of ontogenesis; 2) ontogenesis formed by stages - continuous or intermittent; 3) convergence [tr. note: possibly conversion] of types of plants determined by a combination of external conditions. [Begin p.449].

Michurin's genetics must rest upon available proof and upon verified experiments. Some Soviet works include a number of errors of methodology. For instance, experiments for populations have been organized and, in this case, conclusions must be drawn with great care: what is actually taking place, is it influence of environment upon organism, or is it a

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

simple selection of gametes? That is why Michurin's genetics failed, to develop, among other problems, the question concerning the mechanism of heredity of acquired characteristics.

"Science need not be defended, it must be developed" - with these words Prof. Listovskii concluded his address.

Prof. Sharskii expressed the opinion that the presentation of formal genetics in educational institutions is sometimes arranged so that students could gain the impression that it was comprised solely of mistakes. Youth does not know formal genetics, nor its fundamental concepts, and this is bad. The program for evolutionary instruction has to be revised and a textbook of formal genetics must be compiled. It is impossible to argue about things which you do not know.

In conclusion Professor Petrusevich said that the discussion had produced much material for the future work of the Committee on Evolution.

When the discussion was over the Presidium of the Committee on Evolution was elected. On May 30th it held a meeting at which K. Petrusevich was elected Chairman of the Presidium; V. Mikhailov, Deputy Chairman; A. Makarevich, Science Secretary. Members of the Presidium are I. Kolanovskii, R. Kozlovskii, Sh. Pen'enzhek, Z. Raabe, S. Skovron, and G. Telezhinskii.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

EDITORIAL

In printing the somewhat abridged translation of the speeches made during the discussion of general biological problems which took place at the plenary meeting of the Committee on Evolution affiliated with the Department of the Biological Sciences of the Polish Academy of Sciences, held on May 9, 1956, the editors of "Botanicheskii Zhurnal" deem it necessary to make the following comments.

It is obvious from the above article that the discussion of problems, pertaining to species and species-formation, which appears on the pages of some biological journals in the Soviet Union, has played an important role in overcoming dogmatism, excessive declarations, and aimless administration which exerted a negative effect on the development of biology in Poland. At the same time it was not reflected quite accurately in the discussion carried on at the Polish Academy of Sciences. In this discussion are cited, particularly, expressions such as "creative Darwinism", Soviet creative Darwinism", "Michurin's genetics","Michurin's biology", and "Michurinism" as synonyms or, at any rate, as similar concepts. The discussion referred to above has indicated in the USSR that statements made by I. V. Michurin on problems of genetics and the theory of evolution must be distinguished from the viewpoints evolved by Academician T. D. Lysenko and his adherents. These viewpoints concerning intraspecific reciprocal relations between organisms, the origin of species, and evolution of organisms are far removed from the opinions of I. V. Michurin which he explained on the pages of his works. His were original views on some general questions of biology and on problems of genetics which presented a big theoretical interest, he

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

developed his own methods of selection which are of great importance to practice. Hence, there is every reason to speak of Michurin's trend in biology, particularly in genetics and selection, but it would be incorrect to speak of "Michurin's biology".

The works of Michurin have made it clear that, as regards general problems of the theory of evolution, he stood for the principles of Darwin.

The opinions of T. D. Lysenko and his followers are passed by them, without any foundation, for a so-called "creative Darwinism", in contrast to the Darwinism of Darwin which is qualified as "flat Darwinism".

In the USSR, the discussion has revealed the inaccuracy of these views. Darwin's Darwinism has not lost its creative character even now. Material on evolutionary theory accumulated by science since Darwin's time impels it that some rectification be inserted in Darwin's opinions. Thus, for instance, his proposition that intraspecific competition of organisms is always more ruthless than interspecific cannot be accepted at the present time. Yet the fundamental principle of Darwinism, namely the theory of natural selection, is in full force even now.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

A
790

Blinkova, M. V.

Na vsesoiuznom soveshchanii po proizvodstvu gibridnykh semian kukuruzy.

[At the All-Union Conference on the Production of hybrid Corn Seeds].

Zemledelie, vol. 4, no. 6, p.125-128.
June 1956. 20 244

(In Russian)

The Ministry of Agriculture of USSR conducted, in March 1956, in Dnepropetrovsk an All-Union Conference for development of specific measures for carrying out in practice of a resolution by the Central Committee of KPSS and the Soviet of Ministers of USSR "About Methods on How to Make the Kolkhozes and Sovkhozes Switch to Hybrid Seeds in All Their Corn Plantings".

In the work of the Conference there participated chairmen and agriculturists of kolkhozes, directors and specialists of sovkhozes, who were entrusted with the production of hybrid seeds of corn and with the propagation of parental forms; machinists for MTS, workers from party agricultural agencies, specialists from scientific-research institutes, workers from factories producing [Begin p.126] agricultural machinery, from procurement organizations and from government seed-trial grounds - in all 780 persons.

Scientists, specialists and practitioners in agriculture from Poland, Czechoslovakia, Bulgaria, Roumania, Hungary, Albania, and the German Democratic Republic were present at the Conference and took active part in its work.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

In his opening address V. V. Matskevich emphasized that in deciding problems for increase of grain production and of products of animal husbandry, one can say that corn occupies a decisive place.

In our country there are many able experts on corn growing, many farms obtain high yields of corn on large areas.

Scientists, together with workers from kolkhozes and sovkhozes, have produced valuable sorts and hybrids of corn. Of great importance are the double interlinear hybrids; they, together with good agrotechnics, are the most important means for obtaining high yields of corn.

Production of hybrid seeds is not yet well organized. Practical methods for the change of kolkhozes and sovkhozes to plantings of corn with hybrid seeds are given in the accepted resolution.

The All-Union Scientific-Research Institute of Corn has been organized, which, together with other scientific establishments, will work for developing self-pollinated lines of corn. The specially selected seed-growing sovkhozes, upon obtaining seed material from these lines, will grow seeds for simple interlinear hybrids of the first generation in a volume which will fully satisfy the requirements of the hybridization sections. And, finally, specially selected seed-growing sovkhozes and kolkhozes will produce, on hybridization sections, seeds of double interlinear hybrids of corn for a full provision of all the sovkhozes and kolkhozes of the country with hybrid seeds of the first generation.

The participants of the Conference listened with great interest to the report of Doctor of Agricultural Science, Prof. B. P. Sokolov, entitled: "Organization of the production of hybrid seeds of corn", in which he spoke about the importance of hybrid seeds of corn, about their effectiveness in U.S.A., he quoted data from the history of corn hybridization.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

B. P. Sokolov discussed in detail, the theory and practice for obtaining intervarietal and interlinear hybrids; he spoke about the organization of seed growing of hybrid seeds.

G. S. Galeev, who is in charge of the corn laboratory at the Kuban Experiment Station of the All-Union Institute of Plant Industry, gave a report on the subject: "Organization of seed growing of double interlinear corn hybrids in the USSR and in foreign countries". Doctor of Agricultural Science, A. S. Musiiko, spoke about his experience in the work of selection of corn at the All-Union Selection-Genetics Institute.

Candidate of Agricultural Science, D. S. Filev gave a report on the subject: "Basic agrotechnical measures for an increase in the yielding capacity on hybridization sections". D. S. Filev emphasized the importance of a high agrotechnical background on seed growing plantings of corn. "High agrotechnic on seed growing plantings of hybrid corn is an indispensable condition for a successful solution of the problem about the change-over within the next few years to plantings of corn with hybrid seeds in all regions of its cultivation for seeds and for silage in milk-wax stage of ripeness. Only under this condition will we be able to guarantee a high coefficient of propagation of the initial parental forms, which take part in the process of hybridization, as well as the yearly production of the necessary amount of hybrid seed of the first generation". The speaker reported in great detail the methods of agrotechnics for corn, taking into consideration the zonal peculiarities.

D. I. Dmitriev, an agriculturist in "Labinskii" sovkhoz in Krasnodarskii region, stated that in 1955 the plantings on hybridization sections in the sovkhoz have grown almost to 120 ha. Citing his sovkhoz as an example, he showed that this work is not a complicated one. The main thing that is

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

required is an accuracy in the work.

A. P. Nezhivoi, president of the kolkhoz "imeni Stalina", of Dnepropetrovskii raion, of Dnepropetrovskoi oblast' related how the kolkhoz propagates elite seeds for parental forms of hybrids and supplies them to the kolkhozes for plantings on hybridization sections. In 1955, in the kolkhoz the initial forms were grown on 80 ha, and they delivered to the Zagotzerno [office for Procurement of Grains] 1300 c of high-quality seeds from parental forms of hybrids. The practice of the kolkhoz has shown, that growing of hybrid seeds of corn does not require a large input of labor; compared to the regular planting, 6-7 work days per 1 ha must be additionally put in. Every work day, which was spent for the production of hybrid seeds of corn, was paid off next year by 35-40 c. of grain.

Academician P. P. Lobanov addressed the meeting with a long speech.

The conference heartily approved the measures for methods of the change over of kolkhozes and sovkhozes to the plantings of corn with hybrid seeds. From the speeches it became apparent that many of the oblasts, which began to produce corn in earnest, have achieved great results. For instance, kolkhozes in Odesskaia oblast', in 1955, obtained from 470 thousand ha-25.1 c per ha; in Dnepropetrovskaia oblast' from a large area 21 c, in Krivogradskaia oblast'-23 c of corn per ha, and so on.

Kolkhozes of many oblasts in the Ukraine (Odesskaia, Khar'kovskaia, Dnepropetrovskaia, Zaporozhskaia, Krivogradskaia, Cherkasskaia and others) will carry out the change over to a uniform planting with hybrid seeds in the next two years. [Begin p.127]

Members of the Conference exchanged their opinions on problems of selection, agrotechnics, and mechanisation of corn, taking into consideration the peculiarities of different zones of USSR; the most difficult places in

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

the agrotechnics and in mechanisation of the cultivation of this crop were cleared up.

The kolkhoz "imeni Stalina", of Novoukrainskogo raion in Krivogradskoi oblast', having planted in 1955 the Dnepropetrovskaia variety, obtained 38 c of grain and on sections where a double interlinear hybrid was sown - 45 c were harvested. An inspector from the Government Commission on Variety Testing of Agricultural Crops in Odesskaia oblast', Iu. Z. Isarov reported that, in the kolkhoz "imeni Budennogo", of the Berezovskii raion, on sections, which were planted to hybrid seeds of VIR 42, the increase of yield consisted of 17 c per ha.

An agriculturist of the kolkhoz "imeni Kalinina" in Novo-Moskovskii raion, Dnepropetrovskaia oblast', G. S. Demchenko stated that hybrid seeds of corn when compared to standard varieties gave an increase in yield of not less than 5-6 c per ha.

Discussions developed about many problems in selection, seed growing and agrotechnics. For instance, some of the scientific workers came forward with suggestion for wide-row planting of corn, which was to be utilized as green fodder. But the Conference came to conclusion that with the present day technique the check-hill method of planting is the only method that permits utilization of mechanisation during the cultivation of crops and keeps the corn fields in a clean state. The wide-row planting of corn for green fodder gives good results only on fields of experimental establishments, which are highly cultivated and free from weeds.

At the Conference several speeches had as their subject the problem of how to increase proteins in one feeding rations of animals, either by means of joint plantings of corn with seed-legume crops, or through development of corn hybrids with a heightened content of protein in the grain and in the green mass.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Several Sections were working during this Conference.

The Section for selection, seed growing and agrotechnics of corn discussed and inserted some changes and additions into the "Specific directions on growing hybrid seeds of corn and of their parental forms", which were prepared by the Chief Administration of Agricultural Science. This Section recommended basic methods for selection, for the creation of double interlinear hybrids, for developing self-pollinated lines, for evolving hybrids with male sterility, for the creation of varieties and hybrids in new regions, for equipping the experimental establishments with apparatus and equipment. A decision on seed growing was accepted; certain types of farms were recommended for the production of hybrid seeds of the first generation; an order was worked out for delivering the hybrid seeds to procurement organizations, and others.

The Section on mechanization of corn cultivation developed specific measures for mechanization of planting and for the care and harvesting of corn. It was recognized that it will be expedient to change over everywhere, during 1956-1957, to planting corn with standardized seeds; machines for calibrating the seeds were recommended; new assignments for construction of more efficient devices for the grain-drills for a precise sowing of seeds were also recommended. The Section also reckoned that, not later than in 1957, it would be necessary to change the sowing of corn to a diagonal method of shifting of the measuring wire, which will help to reduce the personnel engaged in the sowing operation, from 7 to 1-2 people. Some measures for improving the check-hill method of planting in 1956 were also recommended; in particular a mechanical carrier for the measuring wire, and others.

Some of the speakers in the section called the attention of the Ministry

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

of Tractor and of Agricultural Machine-Building to the insufficient operation dependability of the corn-harvesting combine KU-2;; to the great losses of and damage to the corn cobs which take place when harvesting is done with this combine.

The Section also recommended that the Ministry of Tractor and of Agricultural Machine-Building be asked to guarantee a switching, in the near future, to the construction of the modernized corn-harvesting combine KU-2A, which showed positive results during tests; to put out, in time for harvesting in 1956, a series of combines KU-8 for their wide testing under farm conditions, as well as to intensify the work of creating new types of corn-harvesting combines of high efficiency; to pay special attention to the loss and damage to corn cobs and to the improvement of the husking operation.

The Section introduced a proposal to provide the corn-harvesting combines with transportation facilities for hauling corn cobs and silage mass; recommended immediate review of the nomenclature and the orders for spare parts for machines, which are being put out, and so on.

The Section for drying and storing of corn seeds discussed, for the first time, the important problems, which are linked to the sowing qualities of seeds. Taking into consideration that the drying and storing facilities for corn seeds must be arranged in our country practically anew, the Section worked out some practical suggestions on this problem.

At Sections of party workers of Soviet and agricultural agencies the following reports were heard: "About measures for increasing corn production" given by Deputy Minister of Agriculture in USSR, K. S. Nazarenko and "About the preparation of the kolkhozes of the republic for growing high yields of corn in 1956" - given by the Minister of Agriculture of Ukrainian SSR, M. S. Spivak.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

I. A. Danilenko, director of the Ukrainian Scientific-Research Institute of Animal Husbandry gave a report about utilizing corn for feeding [Begin p.128] cattle and for fattening swine. He emphasized the importance of the modern feeding of corn - there is no need to await the milk stage of ripeness. It is also good to plant legumes jointly with corn; soy beans are especially good for this purpose. The speaker explained how favorable fermentation affects the assimilability of silage; how the preparation of this feed can be cheapened, and its quality improved by packing it in sectionless trenches and tamping it down with caterpillar tractors.

Deputy President of the Soviet of Ministers of the Moldavian SSR, S. P. Efimov, spoke about measures, which are being conducted in the republic for the increase of corn production.

A. V. Denisov, president of a kolkhoz "imeni Michurina, in Krivoozerskii region, of Nikolaevskaia oblast', gave a report on "Corn - as a basis for high productiveness in animal husbandry". He reported, that his kolkhoz planted 550 ha under corn for seeds, 138 ha for green fodder and 144 ha for silaging of corn cobs in the milk-wax stage of ripeness. They harvested 37.5 c of corn seeds per 1 ha; 89 c of corn cobs in milk-wax stage of ripeness and 150 c of green mass. In the total harvest of grains more than half is made up of corn.

I. D. Gladnev, secretary of the Magdalinskii RK KP of the Ukraine, in Dnepropetrovskaia oblast', gave a report about the experience of party and Soviet organizations in a struggle for a high yield of corn.

Scientists from the democratic countries made reports and spoke of their experiments and of their results at plenary meetings and in Sections.

It was arranged for all the participants in the Conference to inspect the work of all the machines for planting, calibration of seeds, care and

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

harvest of corn; in the halls of the Conference an exposition was presented showing data of the experiment establishments, of kolkhozes, of sovkhozes on selection, seed growing, agrotechnics, utilization of corn, drying and storing of seed corn, control of pests and diseases of corn. A special stand was given over to show the attainments of kolkhoz-leaders in corn plantings.

Reports of this Conference are published in a separate book.

M. V. Blinkova
Candidate in Agricultural Science.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

A 791

Dadykin, V. P.

Voprosy fisiologii rastenii na krainem severe.

[Problems of plant physiology in the Extreme North [of USSR].

Akad. Nauk SSSR. Iakutskii Filial. Inst. Biol. Trudy, no. 1, p.74-84. 1955. 442.9 Ak15

(In Russian)

About 60 years ago K. A. Timiriazev in his work "Half a century of experiment stations" wrote: "One of the basic problems - the problem of dependence of plants on climatic conditions - is still in its infancy. The usual method for calculation of temperature sums represents only a rough approximation; an accurate result can be expected only from a series of actinometric and of physiological experiments conducted parallel with them (1948, v. II, p.218).

Notwithstanding the great strides made in biological science, we cannot, unfortunately, brag that we already know everthing about this problem and especially so for the regions of Extreme North, where many new lands are being brought under cultivation.

In general the peculiarity of natural conditions of the Extreme North consists of a low temperature of the air, of a prolonged arctic day, of the presence in most regions of eternal congelation, or at least of very low temperatures of the soil in the zone where the plant roots are spread, and of very moderate amounts of precipitation.

But regardless of all these climatic peculiarities in the Extreme North agriculture is moving forward into the transarctic region; new northern

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

varieties of cultivated crops are being formed with quite distinct requirements for the new environment; northern virgin lands are being transformed into fertile fields.

At the very beginning of the scientific work on agriculture in the Extreme North physiological research has contributed much towards developing a correct understanding of peculiarities in the development of plants in the North.

Let us be reminded of the works of I. G. Eikfel'd in Khibiny and of the works of the section of physiology of the Arctic Department of the All-Union Institute of Plant Growing, which was working at that time under the leadership of V. I. Razumov.

I. G. Eikhfel'd thus formulated the problems of the physiology sector: "Studies of those changes which are endured by the plants during their growth and development under unusual conditions of the Extreme North, as well as studying the methods of active influence on the development of plants. The aim of such research is to rationally utilize in plant growing the positive peculiarities of the native environment of the subarctic zone and to remove or soften the negative factors, which prevent obtaining high yields" (1934, p.39).

The close link between the photoperiod and the temperature requirements of plants was discovered at that time. Thus, for instance, tuber formation in potatoes at low temperatures and a long day proceeds considerably more energetically, than during a short day, and, on the contrary, during a short day low temperatures depress tuber formation.

A phenomenon of bolting in biennials was established and its causes found out.

Many more peculiarities in the conduct of grain crops during the long

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

arctic day were discovered, but, unfortunately, these physiological works were suspended very soon.

The character of physiological activity of plants, both cultivated and wild, is very little investigated.

Thus, there are no convincing experimental data on the influence of the long day on the most important physiological process of the higher plants - photosynthesis, although there is a widely spread idea that the long 24-hour day guarantees an around-the-clock assimilation of carbon dioxide.

S. P. Kostychev with his co-workers, who on Murmanskii shores studied photosynthesis of many representatives of the wild flora (cloudberry, sorrel, buttercup, timothy and onion) to ascertain that photosynthesis continues around-the-clock during the summer solstice, and the 24-hour assimilation guarantees a large daily yield of products of assimilation. Stomata of the studied plants remain open around-the-clock.

Gi I. Poplavskaia and her co-workers, who worked on Kol'skii peninsula, obtained different results. Some species stopped assimilation during night hours (although there was light), others continued this process uninterrupted. Stomata, during the arctic day, at times were opened, at times closed.

Similar contradictive results of research in photosynthesis also can be found in some foreign research.

In 1951 we made observations, together with V. G. Grigor'eva, on a series of 24-hour cycles of photosynthesis in potatoes and birches in the transarctic region. We obtained an antipodal reaction of both plants to the long day. Birch continued to assimilate around-the-clock. Potatoes stopped their photosynthetic work for 4-6 hours during the night,

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

although there was bright sunlight.

In the light of V. N. Cherkasov's (1965) data, which ascertained that potatoes were introduced into Russia not from the west, but from the east, and which supposed that Aliaska is the most likely birthplace of the modern European potatoes, it is extremely interesting to subject different varieties of potatoes to analysis concerning the light factor.

V. N. Cherkasov comes to the conclusion that there are enough reasons to see potatoes as a plant whose biological element was formed in the North.

It is known that a change in behavior of plant organisms to light is a very rare phenomenon under natural conditions, or at any rate it is not a deep one even after long cultivation of plants in geographical latitudes which are different in light conditions.

This makes it easier to understand the energetic tuber formation of potatoes, which was observed by I. G. Eikhfel'd during a long day and at low temperatures, as well as the obtaining of extremely high crops of potatoes in northern and extreme northern regions.

Pechorskaia experimental station in Ust'-Tsil'ma obtained crops of potatoes up to 590 c/ha on its fields. On Khibinskoi station average yields were 300-350 c/ha. The rise of crops of potatoes, when moving north, can be observed on the example of Finland, whose territory has spread latitudinally to 1200 km. In its southern regions the yields of potatoes are 10 t/ha, while in the northern parts of the country over 16 t/ha are systematically harvested, almost up to 70° northern latitude.

All that which is needed to be investigated in respect to photosynthesis and to the influence of light in general on the growth and development of the plant is not exhausted with potatoes. They are just an

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

example of what unexpected problems in quite different fields of science can be uncovered by utilizing physiological methods. In order to ascertain the north-eastern origin of European potatoes, a physiological analyses of this plant must be made. Thus, physiological methods render a service to the history of science, and, at the same time, are also helpful in selection work on potatoes.

Only by understanding the peculiarity of photosynthetic reactions of various plants in the Extreme North, can one approach the formation of the largest assimilating surface in order to obtain greater yields in the light of treatment of this problem by A. A. Nichiporovich.

The question of carbon feeding of plants in general adjoins very directly the problem of photosynthesis under the light conditions of the Extreme North. After extremely important discoveries by Soviet scientists in the last few years (Kursanov, Kuzin and Mamyl' in 1951; G. K. Samokhvalov, 1952, and others), which demonstrated the fact of absorption of carbon dioxide by the roots of plants, the whole problem of carbon feeding of plants needs a revision.

It is established, that carbon dioxide, which is absorbed by the roots is of very considerable importance in the general balance of carbon feeding of plants; this carbon dioxide very quickly reaches the leaves, increases in them the contents of chlorophyll, and through the process of photosynthesis is transformed into organic substances.

In the experiments by A. L. Kursanov, by N. N. Kriukova and B. B. Vartapetian (1952) the amount of carbon dioxide, which was absorbed by the roots, constituted approximately 1/4 of that amount which was absorbed by the leaves at favorable conditions of photosynthesis. It is quite possible, that in nature there can arise a situation with a different

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

presence of carbon dioxide in the soil and in the air. G. K. Samokhvalov's experiments showed that the chlorophyll content of plants which obtained CO_2 through the roots increased.

As it is known, in northern regions, there is a much smaller amount of carbon dioxide gas both in soils and in layers of air near the ground than in central regions of the country. Thus, deeper studies of the role of carbon feeding through the roots can lead to important practical decisions about a high effectiveness of utilization of certain carbon fertilizers.

In the recently published researches by V. I. Marenov, and A. M. Kuzin (1954) it was shown that carbon from organic fertilizers is assimilated not only with the assistance of microflora in the soil, but it is also directly assimilated by the plants, most probably in the form of easily soluble organic compounds of fertilizers. A direct assimilation from the soil of such low-molecular soluble substances, as sugar and amino acids, as well as of organic acids, proceeds with great intensity. The substances, cited above, are very quickly transformed into complete organic compounds and are assimilated in this manner upon entering the plants. This conversion proceeds faster in the light.

In the light of these facts the importance of organic fertilizers is evaluated quite differently. Manure and other forms of organic fertilizers prove to be not only a source of mineral food and of nitrogen for the plants, but also a source which replenishes the stores of carbon dioxide, which can be utilized not only by the leaves after its secretion from ho the soil, but also by the roots.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The water process in the plants of the north is no less interesting.

Botanists and physiologists analyze in detail and enumerate the amazing adaptations of the arctic and subarctic flora to the severe conditions there. They record: the dwarfishness of northern plants, their fuzziness, their xeromorphous constitution, a high cutinization of leaves, and so on. But, where the roots are concerned, immediately the theory of physiological dryness is brought out. They do not give the roots the same right to adapt themselves as they give to the aboveground organs.

Up to now such men as N. V. Pavlov in his "Botanical geography of USSR" (1948) and later "Ecology of plants" by A. P. Shennikov (1950) still speak about the physiological dryness of cold soils. But it is very characteristic that those sresearchers, who did experimental work on physiological characteristics of plants in transarctic regions repudiate this theory either fully or in part. To such researchers belong S. V. Bystrov (1939), A. N. Danilov (1948), O. A. Val'ter and V. A. Begachev (1950), who worked on the Kol'skii peninsula.

The feasibility of plants to reorganize their nature, adapting themselves to conditions of cold are determined by a quality of the protoplasm.

Our further experiments permitted to establish that the main cause of unsatisfactory growth of plants on cold soils is the difficulty of the plants to utilize some nutrients, and, particularly, nitrogen. These difficulties arise, probably, as a result of disturbances in the synthetic action of the protoplasm in the cells of root tissue.

We could ascertain the cause of the unsatisfactory growth of plants at low temperatures in the zone of roots by utilizing a method of "isolated temperatures" which we developed.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The essence of the method is that we divided into two strands the roots of sprouts and put each one in a separate vessel. The vessels were mounted at right angles. The vertical vessel was placed into a chilled bath, the temperature, of which must be 1-2°; the horizontal vessel stayed outside the bath and retained a temperature of the vegetative pavilion.

Through a series of such vessels the plants were offered all the nutrients from the cold medium in succession, and that is how a sharp depression in growth was found from "cold" nitrogen.

Using a biochemical method for finding out a distinct action of nutrients, either on a "cold" or a "warm" background, permitted to determine that nitrogen enters intensively enough into the plants, cultivated on a background of low temperatures in the zone of roots, and the percentage of its content in some cases even surpasses its content in control plants. Yet in all "cold" variants the content of albuminous nitrogen is considerably smaller in regard to the whole, than in the control plants. This permitted us to come to the conclusion, that the low temperature in the zone of the roots does not prevent the entrance of nitrogen into the plant, but rather upsets the processes of synthesis of nitrogenous substances. And there occurs in the plant organism a sort of surplus of the absorbed nitrogenous substances, which is not assimilated, and this then is reflected in the general unsatisfactory development of the whole plant.

Having an idea (according to Sabinin, 1949, and others) that a root is an organ, which carries on the function of absorption of nutrients and of water, as well as produces a series of complete organic substances needed by the plant, it is extremely important to find out how the specific conditions of Extreme North - the low temperatures of the soil - influence these functions of the root; and to find ways to accelerate the synthetic

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

activity of the root. Obviously, one can, by utilizing radioactive isotopes in experiments with feeding of plants at sharp temperature conditions in the soil, as well as by utilizing methods of chromatography, interpret the peculiarity of biochemical processes depending on the temperature factor.

Having found out the actual physiological cause of unsatisfactory growth of plants in cold soils it then became possible to find ways to overcome the difficulty.

One of the methods for overcoming this difficulty is, first of all, to use some forms of microfertilizers. Through some researches by M. Ia. Shkol'nikov (1950) and by his co-workers the important influence of microelements on the physico-chemical properties of colloids of the protoplasm was discovered, and, consequently, it was found that it affected the metabolism in general. A distinctive action of certain microelements, depending on the temperature, was also ascertained. Our preliminary experiments have confirmed the possiblity of effecting the utilization by the plants of basic elements of nutrition at low temperatures in the zone of roots by means of introduction of a series of microelements (boron, lithium, and even platinum) (Dadykin, 1952).

Secondly, it was found out that the yields of crops on northern fields could be effected by accurate doses and correlations of fertilizers, which are being introduced under certain crops.

We arrived at the necessity to change the doses and the correlations of fertilizers by analyzing the practice of use of fertilizers in the Extreme North.

Even the first experiments on the Khibinskaia Experiment Station, when fertilizing potatoes have shown the need to use high doses of ferti-

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

lizers, both organic and mineral. Later experiments on other stations also confirmed this as well as the necessity to introduce high doses of both organic and mineral fertilizers simultaneously. Also, although an intensive yearly introduction of fertilizers must lead to a change of agronomical characteristics, yet, the soils of the Extreme North need systematic high fertilization if one expects to obtain high yields.

Agrochemical analyses have disclosed in these soils contents of free, or easily available forms of nitrate and ammonium nitrogen, phosphoric acid and potassium in such amounts, that, under normal conditions, these soils would not require any fertilizers at all. But elimination of only the mineral fertilizers on sections, which were cultivated for 8-9 years, brings about a decrease of the crop more than three times (Dadykin, 1947).

Experiments have shown that the highest concentration of nutrients at cold temperatures lies, probably, around 4-5 doses of the normal Knop's nutrient medium.

But the most effective way, which quickly enters into the practice of northern agriculture is the third way - the practice of supplementary leaf-feeding.

Basing ourselves on researches of Bussengo, of Vilia, Demontovicha and Zheleznova, who ascertained that nutrients can be absorbed by the leaves, as well as on the recent works of Matskov and of his co-workers, which developed this to an agromethod, used in production work, we assumed that by feeding nitrogen through the leaves we can increase the utilization of this fertilizer and obtain a better yield.

At the present time it has been established that nutrients which are applied to the leaves are utilized by the whole plant. The nutrients which are thus obtained by the plant are also producing a positive influence on

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

the photosynthesis and on the activity of ferment in the plant organism (Avdonin, 1954).

In 1950 we conducted two field experiments with supplementary leaf-feeding with nitrogen of cabbage and potatoes. A very substantial increase in the yields was obtained: 20% for potatoes, and 63% for cabbage, when compared to the control.

Many of the experimental establishments of the Institute of Arctic Agriculture continued to study this supplementary leaf-feeding. P. P. Pasechnik (1954) reported about obtaining increases up to 60% as a result of three leaf-feedings of turnips with 1.6% solution of ammonium nitrate and boron in sovkhozes on Kolym, and he insisted that it should be widely utilized on production levels. It is practiced now.

N. L. Sharova (1954), in an experiment with leaf-feeding of gladioli, has shown that not only the aboveground organs benefit from such supplementary feeding, but the underground organs as well.

V. G. Grigor'eva (1953) tried to delve deeper into the peculiarities of passing through phasic stages of development by plants, which are cultivated under extreme conditions; she tried to analyze the influence of low temperature of the soil on the development of barley.

The barley plants, which were grown at a temperature of soil within the limits of 2-3.5°, were rated by her daily, and changes in the cone of growth were traced under a microscope. Analysis showed that the cold soil brings about an intense elongation in the length of the luminous stage, as well as retards the formation of spike's tubercles, which usually starts after the luminous stage. V. G. Grigor'eva thinks that this is caused by a disruption of the general metabolism in the plant, which also leads to a deterioration in the condition of feeding of the forming spike.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

These and other data of experiments, where the underground organs were deprived of necessary conditions for development, while the above-ground parts have quite favorable conditions, permit to assume that the phasic changes depend on both the above and the underground organs in plants. About the same thoughts can be found in a work by M. Kh. Chailakhian (1950).

Obviously, this problem must be yet worked out by plant physiologists in the Extreme North.

The living roots of some plants which were found in frozen horizons of soil, are of great general biological interest (Dadykin, 1950, 1952). They were also found by some other authors (Serebriakov, 1952). The viability of roots in a frozen soil is, as though, expanding the borders of life.

At the present time one cannot yet speak about an active intrusion of roots into the layers of frozen ground, as the upper surface of the congelation varies from year to year, and the roots could have entered the lower levels of soil under favorable, warm conditions and be caught up by the risen congelation.

The studies of the character of spreading in the soil and of the general morphology and anatomy of underground organs of plants in various natural regions of the Extreme North were just started (Dadykin, 1950, 1952; Tyrtikov, 1951); and further studies can uncover many interesting facts in the adaptability of plants to extreme conditions.

Further successes in northern agriculture depend on the studies of peculiarities of the physiological activity of the plants under the unique circumstances of the Extreme North.

It seems to us, that for agriculture the most important problems of physiological activity of plants, depending on the conditions of the environ-

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

ment in the Extreme North, can be brought together in the following four groups:

1) water conditions in plants;
2) root feeding of plants;
3) air feeding of plants;
4) development and growth of plants under natural conditions of the Extreme North.

The works on accumulating data on the physiology of plants in the North should not be postponed to the time when there will be organized well equipped laboratories in the Extreme North; there are many simple methods which can help in this work right now.

A systematic accumulation of facts will help in developing of theoretical ideas about the peculiarities of life of plants in these regions. This will lead to a formulation of a theory for arctic agriculture.

LITERATURE

Avdonin, N. S., 1954. Supplementary feeding of agricultural plants. Sel'khozgiz.

Bystrov, S. V., 1939. About the causes producing woodless tracts in the valley tundra in Khibiny. Sov. bot. no. 6.

Val'ter, O. A. and V. A. Begacheva, 1950. Characteristic of the activity of the root system of plants in transarctic region. Eksperiment. bot. no. 7.

Genkel', P. A. and L. D. Kudriashov, 1950. Botanika, Uchpedgiz.

Grigor'eva, V. G., 1950. About the accumulation of starch in roots, which are found in frozen ground. DAN USSR, v. 72, no. 6.

Grigor'eva, V. G., 1953. Influence of low temperatures of the soil on the development of barley. Selekts. i semenov., no. 2.

Dadykin, V. P., 1938. Arctic agriculture. Geography in school, no. 1.

Dadykin, V. P., 1947. Action of mineral fertilizers on yields of potatoes on cultivated soils on Kol'skii peninsula. Dokl. VASKhNIL, no. 2.

Dadykin, V. P., 1950. To acquiring knowledge about root systems of plants, which are developing on the continuously cold soils. Bull. Mosk. obshch. estestvoisp., otd. biolog., vol. V, no. 3.

Dadykin, V. P., 1952. Peculiarities in the conduct of plants on cold soils. Izd. AN USSR.

Dadykin, V. P., and V. G. Grigor'eva, 1951. About photosynthesis in plants of the transarctic region at an around-the-clock lighting. DAN USSR, v. 80, no. 2.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Danilov, A. N., 1948. Ecologo-physiological characteristic of psychrophytes of the transarctic region. Eksperiment. bot., no. 6.

Kursanov, A. L., N. N. Kriukova, B. B. Vartapetian, 1952. Movement along the plant of carbon dioxide, which enters through the roots. DAN USSR, v. 85, no. 4.

Kursanov, A. L., A. M. Kuzin, Ia. V. Mamul', 1951. About the possibility of assimilation by the plant of carbonates, which enter together with the soil solution. DAN USSR, vol. 79, no. 4.

Marenova, V. I., and A. M. Kuzin, 1954. Analysis of direct absorption by the plant of carbon from organic compounds. DAN USSR, v. 94, no. 4.

Pavlov, N. V., 1948. Botanical geography of USSR. Alma-Ata.

Pasechnik, P. P., 1954. For a 500-centner yield of fodder root crops on Kolym. Magadan.

Poplavskaia, G. I., S. I. Petrova and E. P. Iashumova, 1938. Materials on studies of ecology of arctic plants. Tr. Leningr. obshch. estestvo-isp, v. 67, no. 3.

Sabinin, D. A., 1949. About the importance of the root system in the metabolism of a plant. Izd. AN USSR.

Samokhvalov, G. K., 1952. Something new about carbon feeding of plants. Khar'kov.

Serebriakov, I. G., 1952. Morphology of vegetative organs of higher plants. Izd. "Sov. nauka".

Timiriazev, K. A., 1948. Selected works, V. II and III.

Tyrtikov, A. P., 1951. Spreading of root systems on the northern boundary of forests. Vestn. Mosk. univ., no. 10.

Chailakhian, M. Kh., 1950. About the role of roots in the photoperiodical reaction of plants. DAN USSR, v. 72, no. 4.

Cherkasov, V. N., 1953. About the history of potatoes. Sel'khozgiz.

Sharova, N. L., 1954. An experiment in leaf-feeding of gladiolus. DAN USSR, v. 94, no. 1.

Shennikov, A. P., 1950. Ecology of plants. Izd. "Sov. nauka".

Shkol'nik, M. Ia., 1950. Physiological role of microelements in plants. Referaty dokladov na konferentsii po microelementam. Izd. AN USSR.

Shkol'nik, M. Ia., N. A. Makarov, M. M. Steklova, 1950. About the causes of dissimilar requirements in boron in different plants and its dependence on the factors of the environment. Referaty dokladov na konferentsii po microelementam. Izd. AN USSR.

Finland, 1953. Geographical collection. Izd. inostr. liter.

Eikhfel'd, I. G., 1934. A problem of northern plant growing, no. IV.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Golovin, P. N. (Reviewer)

Ob izmenchivosti vidov rzhavchiny khlebnykh zlakov, by M. A. Mkhitarian. Izvestiia Akad. Nauk Arm. SSR v. 5, no. 12, p. 13-26, 1952

[About the variability of species of rust in grain crops].

Botanicheskii Zhurnal, vol. 41, no. 1, p.106-108. Jan. 1956. 451 R923

(In Russian)

A 792

The article by M. A. Mkhitarian touches upon one of the most complicated, and, at the same time, especially interesting and important questions in contemporary biology - the problem about species in plants, and, in particular, in fungi. It is examined as a part of a large and complicated question about the variability of species, about form and species formation. [Begin p.107]

The complexity of the problem consists, first of all, in the fact that there are very few actual data, based on precise experiment, and logic appears to be the basic argument during its considerations. The available facts and observations are most often interpreted by different researchers from that aspect which is desirable to them, and very often one and the same fact is being given as a proof for exactly opposite points of view.

M. A. Mkhitarian is interested in a particular question, which concerns only the variability of species of rust in grain crops. It would seem that under such circumstances one should proceed in one's reasonings from a carefully tested material and from data of a precisely conducted experiment. In fact it is quite different. In Mkhitarian's article it is

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

hard to find anything else except a clearly expressed wish to make a "discovery" in science, and to discredit the authoritative and great Soviet scientists, deserving all the esteem, who dedicated all their lives to real scientific investigations and always tried painstakingly to avoid poorly substantiated or shaky conclusions.

Mkhitarian tries to generalize his exceptionally superficial observations, which were made on an insignificant number of objects, and make from these generalizations some conclusions which will proceed very far. He does not give one single proof, which is based on an already known experiment; and the experiments which he himself conducted do not guarantee any degree of the required accuracy.

On pages 14-15, M. A. Mkhitarian categorically denies the sexual process in rust fungi, whereas he does not give any proofs, except some reasonings which show the author's inexperience in problems of general biology, and, in particular, in questions of mycology. Thus, he writes: "the same cells of teleutospores [teliospores], when germinating under similar conditions, cannot form any basidiospores, having characteristics of the female, and basidiospores having characteristics of the male sex. Thus, there is no basis to ascribe to basidiospores, which do not differ from each other in form or substance, any characteristics or properties of sexes." The author has no time to discriminate in all this - to check, to prove, to try to understand the sexual process as a great and complicated manifestation of life.

Apparently, the author thinks that there is no distinction between basidiospores and the cells of teliospores, from which the basidiospores are formed.

M. A. Mkhitarian, for some reason, found it necessary to pounce upon N. A. Maumov and defamed him in his adherence to Mendelism-Morganism.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Probably Mkhitarian never took time to acquaint himself with the previous works, and, in particular, with the classical researches of prof. L. I. Kursanov, who was the first to establish the merging of heterothallic [razdel'nopol'nykh] elements in rust fungi. Of course, Mkhitarian had no wish to spend years of labor for painstaking work on these problems, with a complicated technique and the necessary punctuality of the experiment.

The author's assertions that the rust fungi have neither sexual organs, nor any cells of different sexes, is a naked phrase, having no basis, which is easily explained by the fact that the author simply did not understand anything in the interchange of nuclear phases in rust fungi, and besides this, by the fact that this process is clearly in the way of his "discoveries".

The author does not know well, or does not understand well the ideas of T. D. Lysenko about the importance of the sexual process. The author often literally "prophesizes" these or other "truths", denying well proved cases, but without substantiating his denials. This assertions are proofless and in this rudely differ from the carefully proven cases, which the author wants to destroy, come what may.

We must give credit to Mkhitarian, because he tried to experiment. One must pay attention to his experiment of transplantation of barberry, brought over from Stepanovskii raion into the experimental garden in Erevan'. He writes that in spring some aicidia formed on the transplanted samples. "This fact discloses, that rust mycelia overwinter in the buds of an infected barberry". It would seem that one should contemplate this fact, but the author dispenses with this in his conclusions. Meanwhile, had the author thoughtfully approached the results of his observations, he would have come to conclusion that on barberry develop aecidia not of only Puccinia graminis, but of four other species of rust. He would have found indications, obtainable in literature, that grain crops become infected by only the aecio-

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

spores of P. graminis, while the aeciospores of other species do not infect the grain crops. It is known that P. graminis do not have any overwintering mycelium in barberry's buds. It is hard to tell with which of the species the author had to do, but it was not P. graminis; it is natural, that his attempts to infect the cultivated grains with aeciospores were unsuccessful. Evidently the author had to do with P. arrhenatheri, whose aeciospores infect the wild grains. Whereas, it is on this fact that the author builds his deductions and conclusions, affirming that aeciospores of barberry do not infect the grain crops.

Here too the author permits himself a still greater liberty. He says that "the aeciospores which formed on barberry, for the most part, infect the leaves of barberry proper, and even at artificial infectious (with a suspension of fresh aeciospores), in many cases, did not infect any grain crops. In this phrase are permitted such expressions as, [Begin p.108] "for the most part" and "in many cases", which reveals the fact that the author himself has doubts of his conclusions. The author does not give any proofs that, in a precise experiment, he could infect the leaves of barberry with the aeciospores taken from barberry. Apparently, he did not conduct such experiments, and even if he tried, then,of course, he was not sucessful and thus could not cite any factual data.

This then is the cause of all the confusion, and of all these proofless assertions which the author permits himself.

Mkhitarian has no grounds to ascertain that on barberry there is a special species of rust, which merely develops to an aecidium stage, and on grain crops - there is a special, independent species, not connected with barberry. This assertion is not proved by anything, and, to the contrary, there are known data, based on experiments, which permit to say that the

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

author's opinion is not based on evidence.

The author consents that the basidiospores, which are forming during the germination of teliospores on grain crops, infect the barberry. But he evaluates this process as a process of formation from the rust species, which develops on grain crops, of another, independent species, developing exclusively on barberry alone. From where does he concludes this, the author does not say, he gives no proofs, but here again he makes a "discovery" proceeding from a desire to discover.

The author's aggruments and observations in connection with the transformation of P. graminis into P. tricinina [sic], and of this last one into P. glumarum, and vice versa, are based on very badly conducted experiments, where elementary conditions of purity were not observed. He operated with a mixed stock of uredospores, consisting of different species of rust, and there is no wonder, that with different temperature conditions and with mixed infections, he obtained a preeminent development of first one, and then again of another species. Everything was done very crudely, without isolators, without nurseries, without pure cultures, that is without observing any elementary conditions, which are required for conducting such experiments. The very facts, which are cited by the author, were widely known in literature, a long time ago, but he attempts to explain them from exactly opposite grounds. All this testifies that the experiments were conducted by the most primitive methods, and also about his small knowledge about the subject, which the author discusses.

The conclusions of the author are clearly unfounded, and his insignificant experiments are very crude. One is amazed that such an article was printed, and in one of the journals which are published by the organization of the Academy of Science of Armenian SSR.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

It is quite incomprehensible how the reviewers, and the editors of the publication could recommend for printing such an article, so crudely biased.

P. N. Golovin.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8 A-793
(In full)
vg/A

Magnitskii, K. P.

Polevaia laboratoriia dlia analiza pochv i rastenii.

[Field laboratory for soil and plant analysis].

Udobrenie i Urozhai, vol. 1, no. 10, p.23-32. Oct. 1956 67.8 Ud72

(In Russian)

A
793

* * * * * * * *

The Scientific Institute for Fertilizers and Insectofungicides has prepared 12 experimental models of field laboratories which the MSKh SSSR [Ministry of Agriculture, USSR] has distributed among scientific-research institutes for testing in the different districts of the non-black soil zone.

The present article will permit a more extensive examination of the methods of soil and plant analysis proposed by the author.

* * * * * * * *

A field laboratory is an apparatus designed for quick analysis of soils and plants. If it were released in large numbers, the apparatus could be utilized in agrolaboratories of kolkhozes and sovkhozes in the non-black soil zone and on soil expeditions.

The analyses are simple and can be carried out not only by agronomists, but by persons with a general elementary education as well.

To determine the composition of soil, two types of extractions are used -

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

a salt extraction and an acetate-buffer. The salt extraction is used to determine pH, aluminum, manganese, iron, potassium, magnesium, calcium and ammonia. An analysis of 20 soil specimens for 8 specific ions can be carried out in one work-day. The acetate-buffer extraction determines phosphate, sulfate, chloride and nitrate ions. This extraction can be used also to determine potassium, magnesium, calcium, ammonia, manganese, aluminum and iron.

The acetate-buffer extraction is used to determine the characteristics of plant composition and chemistry - nitrate nitrogen, phosphorus, sulfur, chloride, potassium, magnesium, calcium, manganese, aluminum and iron.

DESCRIPTION OF THE APPARATUS

The apparatus is composed of the following parts:

1. A rack with 8 flasks of 50 ml capacity filled with mixed standard solutions.
2. A rack with 8 flasks filled with reagent solutions.
3. A rack with 18 droppers containing reagent solutions required in small amounts.
4. A rack with 4 flasks of 25 ml capacity filled with mixed standard solutions required for an analysis of the acetate-buffer extraction.
5. Three-shelf rack with large test tubes (21 of them) to be used for extraction.
6. Two racks with small test tubes; on one 24 tubes and ten on the other.
7. Small box with 8 small measuring spoons, a solution of sodium nitrate, an acetate-buffer solution, barium sulfate and activated carbon.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

8. Small box containing: a) horn scales with small weights and a base, b) a micro-burette, c) 2 pipettes with markings for 0.5 and 1 ml, d) 2 measuring pipettes of 5 ml capacity with divisions between 0.1 ml. e) a measuring cylinder for 25 ml, f) 2 brushes to clean test tubes, g) small pieces of filter paper and wax paper in packages, h) 4 horn spoons, i) glass rods with blades at one end, j) a towel, k) a set of scales with colored layers used to determine pH, l)instructions and notebooks used to record results of analysis.

The racks and boxes are removed from the case of the apparatus and arranged on a table (fig.). The apparatus is equipped for a simultaneous analysis of 20 samples for 4 elements. The apparatus is provided with a box containing reserve reagents and with a box containing aluminum cups and a sectional auger in the form of walking stick. The reagents available in the apparatus make it possible to analyze 500 soil or plant specimens for all specified ions. The cost of reagents for an analysis of 100 samples amounts to about 20 rubles.

GENERAL PRINCIPLES OF ANALYSIS

The methods of analysis developed by the author in the laboratory of the Liuberets experimental field of NIUIF [Scientific Institute of Fertilizers and Insectofungicides] represent reactions with the formation of colored compounds (colorimetric analysis), or with the formation of a thin suspension (nephelometric analysis), adapted to analysis of soil and plant extractions on spot Plates or in small test tubes. A comparison of the coloring and turbidity of four standard solutions is carried out with scales. For the sake of convenience and to simplify the analytical operation, mixed

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

standard solutions containing several elements in specified concentrations are utilized.

It takes 0.6 or 1 ml of extract to determine each ion. Reagents are used in similar amounts or even in 1--2 drops for each determination. To hasten the analysis, a mixture of several reagents is applied. Every ion is determined in a separate portion of extract without separating the other ions. [Begin p.26] This is accomplished by fixing the interfering ions into complex compounds or by means of compensation. In some cases of ion determination protective colloids are used to increase the stability of the forming suspensions.

If the concentration of individual ions is higher than the last standard, then the extract to be used must be 2-4 times smaller and they must be brought to the indicated volume by the extracting solution. In computing it is necessary to increase the ion content by the corresponding number of times. The analytical results are expressed in milligrams per kg of soil or plants.

SALT EXTRACTION FROM SOIL

By the method which we are proposing, the weighed portion of soil is treated with a sodium nitrate solution at a 1:2.5 ratio. During the interaction between this solution and the soil there occurs a displacement of all cations from the absorption complex of the soil. The cations, however, are not completely displaced, but only their more mobile part. To simplify the work, barium sulfate is added to the soil for the purpose of settling colloidal and organic substances which pass into the extract; this permits using the extract without being filtered. In the separate portions of the obtained extract are determined pH, aluminum, manganese and iron.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Exchange acidity can be determined in the same extraction by the micro-method and the use of a titrated alkaline solution in a 0.02 n* concentration. Data of these definitions characterize the state of soil acidity and enable the analyst to make practical recommendations for soil liming.

Later, exchangeable potassium, magnesium, calcium and ammonium can be determined in the separate portions of the same extract. The indicators of these analyses furnish information as to t he necessity of applying potassium, magnesium and calcium fertilizers, and, in part, as to the availability of nitrogen in soils.

Thus, the analytical results give detailed characteristics of the composition of exchangeable cations in the soil and of their ratios to each other.

TAKING OF SOIL SAMPLES

The taking of samples must be given serious consideration. A sample must characterize the average composition of some part of a field or test plot; this can be achieved by the proper selection of the place and correct taking of the samples themselves. Before commencing to take samples, it is necessary to inspect the field and to divide it into uniform plots, taking into consideration the degree of cultivation, soil moisture, and other indicators. The soil map available at the farm should be utilized when a field is divided into plots. The places where samples are taken and their numbers must be entered on the drawn up plan. The size of the plot from which a sample is taken can be an area of 1--10 ha, depending on the uniformity of the field. One mixed sample is taken with the aid of a

* n--normality.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

soil auger - from each designated plot at the depth of the arable layer from no less than 8 places. The average sample weighing about 40 gr is placed in an aluminum cup. It is best to use fresh soil for the analysis and to determine simultaneously its water content for the calculation of the analytical results for dry substances of the soil. If working conditions are not conducive to analyzing fresh samples, then the soil can be dried out. It must be remembered that in the latter case the analytical data obtained for the content of manganese in soil will be reduced.

PREPARATION OF THE EXTRACTION

Reagents

1. The solution of sodium nitrate 1-normal, 85 gr of salt are diluted in 1 liter of water; the pH of this solution must be within the limits of 6.5--6. The reagent must not contain any admixtures of the ions being determined.

2. Barium sulfate (chda)* is used in the form of finely ground powder. Barium sulfate must not contain any admixtures of the ions being determined and it must not divert the reaction of the sodium nitrate solution by more than 0.1 pH, which can be ascertained when controls are verified. If barium sulfate contains admixtures of the determinable ions, then it is purified as follows: the barium sulfate is transferred to a tall, narrow cup, hydrochloric acid (analytical grade) diluted 1 : 9 in water is poured over it, then it is mixed thoroughly and left standing over-night. The clear liquid

* chda - pure for analysis.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

is poured off and the sediment is rinsed with hot distilled water 5--6 times by means of decantation. Then the sediment is washed with hot water on a porcelain funnel with suction until the chloride ion is removed (after adding a silver nitrate solution the filtrate must remain transparent for 3-5 minutes) and the sediment is dried at 50-70 degrees.

WORKING PROCEDURE

Twenty samples each ten gr of soil are transferred to large test tubes, 5 gr of barium sulfate are measured out and added, and 25 ml of sodium nitrate solution are added with a measuring cylinder (only the last two reagents - freely determined - are placed in the 21st test tube). All test tubes are shaken up simultaneously for 5 minutes and are left to settle over-night until the extract is clear. If hard organic particles are found floating on the surface of the extract, they are removed with a spoon and thrown away.

The analysis of the extract, filtered through a paper filter, produce approximately the same results after 5 minutes of shaking. But in this case it must be ascertained whether or not the filter paper displaces the extract pH, and the first portion of the filtrate must be thrown away. For peat soils the weighed out amount is 2.5 gr. The rest of the reagents are used without any alteration. If the extract happens to be colored then the amount of sulfate must be increased. When the analysis is conducted by this method the results obtained must be increased 4 times.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Determination of ions is carried out in separate portions of the extract and, to hasten the analysis, it is expedient to determine first the pH, aluminum, manganese and iron ions, and then the others. At first all extracts are put on spot plates and into test tubes in sequence, and then the individual ions are analyzed. An analysis of 20 samples for 1 ion is carried out on 2 spot plates (4 cavities are used for standard solutions).

The preparation of standard solutions is a responsible operation. First standard solutions are prepared for each element separtely according to GOST 4212,48 [All-Union State Standard].

Aluminum. One gr of metallic aluminum (a wire or a thin plate) is inserted into a 1-liter volumetric flask, it is dissolved in 2 ml of hydrochloric acid (specific gravity [ud. v.] 1.12) and 18 ml of sulfuric acid (specific gravity 1.18), by adding water the solution is brought up to a liter and is mixed thoroughly. One ml of the solution obtained contains 1 mg of Al.

Manganese. 4.389 gr of chem. pure manganese sulfate (pentahydrous) are placed into a volumetric flask of a 1-liter capacity and dissolved in water, the solution is brought to a liter by adding water and is mixed thoroughly. [Begin p.27] One ml of the solution obtained contains 1 mg of Mn.

Iron. 7.022 gr of chem. pure Mohr's salt are placed into a 1-liter measuring flask and are dissolved in water acidified with 4 ml of sulfuric acid (specific gravity 1.11), the amount is brought up to the marking by adding water and then thoroughly mixed. One ml of the solution obtained contains 1 mg of Fe.

Potassium. 1.907 gr of chem. pure potassium chloride are placed in a 1 liter volumetric flask, dissolved in water, brought to a liter by adding water and thoroughly mixed. One ml of the solution obtained contains 1 mg K.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Magnesium. 1.658 gr of calcined magnesium oxide (pure for analysis) are placed in a 1-liter measuring flask and dissolved in 25 ml of hydrochloric acid (specific gravity 1.12), the solution is brought up to the marking by adding water and is carefully mixed. One ml of the solution obtained contains 1 mg of Mg.

Calcium. 24.97 gr of calcium carbonate (pure for analysis) dried at a 100-105° C temperature up to its permanent weight is placed in a 1-liter volumetric flask and dissolved in 100 ml of hydrochloric acid (specific gravity 1.12), the amount of the solution is brought to 1 liter and is carefully stirred. 1 ml of the solution obtained contains 10 mg of Ca.

Ammonia-nitrogen. 3.819 gr of chemically pure ammonium chloride dried at a 100-105° temperature are placed in a 1-liter volumetric flask and dissolved in water; by adding water, the solution is brought to 1 liter and is thoroughly stirred. One ml of the solution obtained containes 1 mg of nitrogen in the form of ammonium.

One ml of chloroform is added to all standard solutions which then are stored in a dark place.

To increase the efficiency of the operation and to simplify the analysis, two mixed standard solutions are prepared.

1. Mixed standard solution for ions of aluminum, manganese and iron. From the basic standard solutions containing the indicated ions in a 1000 mg per liter concentration, 40 ml are taken for aluminum, 40 ml for manganese and 8 ml for iron and are put in a 1-liter volumetric flask; [the contents] are brought to the marking by adding a sodium nitrate solution and are stirred up. This solution corresponds to standard No. 4. After it has been diluted with a sodium nitrate solution 2, 4 and 10 times, it is used to prepare the standard solutions No. 3, No. 2 and No. 1 respectively. One ml of chloroform is added to all standard solutions.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

CONTENT OF ELEMENTS IN MIXED STANDARD SOLUTIONS (mg/l)

Ions	Number of Standard 1	2	3	4	Ions	Number of Standard 1	2	3	4
Aluminum	4	10	20	40	Potassium	4.8	12	24	48
Manganese	4	10	20	40	Calcium	80	200	400	800
Iron	0.8	2	4	8	Magnesium	1.6	4	8	16
					Ammonia nitrogen	4	10	20	40

Mixed standard solution for ions: potassium, magnesium, calcium and ammonium. For this, 48 ml of the basic standard solutions are used for potassium, 16 ml for magnesium, 80 ml for calcium and 40 ml for ammonium. These solutions are transferred to the 1-liter volumetric flask and are increased up to the marking by adding a solution of sodium nitrate, and then are mixed. This solution corresponds to standard No. 4. [Begin p.28] It is used to prepare the standard solutions No. 3, No. 2 and No. 1 respectively by diluting it with a sodium nitrate solution 2,4 and 10 times. One ml of chloroform is added to every standard solution.

DETERMINATION OF pH OF THE EXTRACT

The determination is based on the capacity of the combined indicator to stain the solutions in various colors in relation to the concentration of hydrogen ions within them.

Reagents. Combination indicator.

1. Methyl red in the amount of 0.1 gr is dissolved in 100 ml of ethyl alcohol (pulverized preliminarily in an agate mortar with a small amount of alcohol), 7.4 ml 0.05 n. of an NaOH solution are added to it and the volume

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

of the solution is brought oto 500 ml by adding water to it.

2. Bromthymol blue in the amount of 0.4 is dissolved in 200 ml of alcohol, 12.8 ml of 0.05 n. of a NaOH solution is added to it and the volume is brought to 1-liter by adding water.

The combination indicator is prepared by mixing one part of the methyl red solution with two parts of the bromthymol blue solution.

Procedure of determination

1. In each cavity of the spot plate is added 1 ml of extract.

2. To each cavity are added 2 drops of the combination indicator and the solution is stirred.

3. The extract coloring obtained is compared with the colored paper scale and the results of the determination are recorded.

DETERMINATION OF ALUMINUM

Reagents

1. Aluminon, 0.2% solution: 0.2 gr of the preparation are dissolved in 100 ml of water and stored in an orange colored flask.

2. Hydroxylamine hydrochloride 5% solution.

3. Acetate-buffer solution. 100 gr. of sodium acetate and 50 ml of ice-cold acetic acid are transferred to a 1-liter volumetric flask, the solution is brought to the marking by adding water and is mixed thoroughly.

4. The mixed reagent for Al is prepared by mixing 76 ml of an acetate-buffer solution, 20 ml of glycerin and 4 ml of hydroxylamine.

5. Mixed standard solutions 1, 2, 3 and 4.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Procedure of determination

1. Standard solutions in the amount of 0.5 ml and 0.5 ml of the [soil] extract are transferred to each cavity of the spot plate.

2. 0.5 ml of mixed reagent are stirred into the extract and standard solutions.

3. One drop of aluminon is also stirred in.

4. Ten minutes after the extracts under investigation had been treated with reagents, their coloring is compared with the coloring of the scale of standard solutions and the results are registered as per table:

No. of standar. mark* [ball]	1	2	3	4
mg of Al in 1 kg of soil	10	25	50	100

Note. 1. Color develops gradually, hence the scale of standard solutions must be treated with reagents simultaneously with the solutions

2. Hydroxylamine hydrochloride diverts the interfering action of Fe.

[Begin p.29]

DETERMINATION OF MANGANESE

The determination is based on the oxidation of the divalent manganese ion in an acid medium by sodium bismuthate up to a heptavalent manganese of permanganate which imparts to the solution a stain from pink to redish purple in relation to the Mn concentration.

* Mark - legend [conditional designation] for the concentration of elements (corresponding to the number of the standard solution) which, under commercial conditions, can be used to record analytical results.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Reagents

1. Sulfuric acid, concentrated.
2. Sodium bismuthate in pulverized form.
3. Mixed standard solutions 1, 2, 3 and 4.

Procedure of determination

1. One ml of standard solutions and extract is transferred with a pipette to small test tubes.

2. 3 drops of sulfuric acid are carefully stirred into each standard solution and extract (volume about 0.1 ml), and the mixture is left to cool to room temperature.

3. Sodium bismuthate powder (about 50 mg) is added with a small blade to the same solutions and extract and the rack with the test tubes is shaken for 30 seconds.

4. After the sediment has settled (in approximately 20--30 minutes) the color of the extract under investigation is compared with the color of the scale of standard solutions and the results are recorded as per table.

Number of standard, mark	1	2	3	4
mg of Mn in 1 kg of soil	10	25	50	100

Note. Chlorine which is usually found in extract in small amounts exerts no influence upon the accuracy of the determination, since sodium bismuthate oxidizes the chloride ion up to free chlorine in the form of a gas.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

DETERMINATION OF IRON

The determination is based on the formation of the complex orthophenanthroline compound and the ion of divalent iron which stains the solution an orange red. Trivalent iron is reduced to divalent by hydroxylamine hydrochloride.

Reagents

1. Orthophenanthroline. Five gr of orthophenanthroline are dissolved in 1 liter of 50% ethyl alcohol.

2. Hydroxylamine hydrochloride, 5% solution.

3. Mixed standard solutions 1, 2, 3 and 4.

Procedure of determination

1. One ml of standard solutions and of the extract under investigation is transferred to each cavity of the spot plate.

2. One drop of hydroxylamine from the dropper is added to each standard solution and extract and the mixtures are stirred.

3. Two drops of orthophenanthroline are added to the same and stirred once more. [Begin p.30].

4. Ten minutes later the color produced in the extract is compared with the color of the scale of standard solutions and the comparative results are registered as in the table:

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Number of standard, mark	1	2	3	4
mg of Fe in 1 kg of soil	2	6	10	20

Explanation. The amount [summa] determined in the analysis is for F^{++} and F^{+++}. Determination without hydroxylamine will produce results for Fe^{++} only. In the latter case hydroxylamine is added only to standard solutions. Exchangeable iron is found in peat and in red soils, and also in the gley of podzolic sod.

DETERMINATION OF POTASSIUM

Determination is based on the comparative intensity of the turbidity in extracts and standard solutions as a result of the formation of a fine potassium residue with a cobalt nitrite reagent. The interference of ammonium ion action is eliminated by formalin. Reaction sensitivy increases when alcohol is added.

Reagents

1. Cobaltnitrite reagent. Cobalt nitrate in the amount of 6.25 gr, and 75 gr of sodium nitrate are dissolved in a 250 ml capacity volumetric flask in approximately 175 ml of water. Then 5 ml of glacial acetic acid are added and the solution is carefully stirred so as to prevent foaming, and then the mixture is left standing over-night. It is diluted with water up to the mark, mixed thoroughly and filtered.

2. Mixture of ethyl and isopropyl alcohols at a 1:1 correlation.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

3. Formalin.

4. Mixed standard solutions 1, 2, 3 and 4.

Procedure of determination

1. Standard solutions and extracts are transferred with a pipette to small test tubes at the rate of 0.5 ml each.

2. To each test tube are added 2 drops of formalin and 0.5 ml of cobalt-nitrite reagent, and the solution is stirred

3. To the above are added 0.5 ml of alcohol each along the walls of the test tubes so the alcohol layer might remain at the top. Both liquid layers are mixed by rotating the whole rack with the test tubes of standard solutions and solutions tested.

4. Ten minutes later the suspension and the color of the solution are compared with the scale of standard solutions, and the results are recorded as per table:

Number of standard, mark	1	2	3	4
mg of K in 1 kg of soil	12	30	60	120

Note. To determine potassium the temperature of the solutions must be within the limits of 20--28 degrees. [Begin p.31]

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

DETERMINATION OF MAGNESIUM

Organic dye -- when magnesium settles in the form of hydroxide, titan yellow is adsorbed by it with a change of color from yellow to red in relation to the magnesium content. The interference of individual ions is removed by means of compensation.

Reagents

1. Titan yellow 0.1% solution. The solution is kept in an orange colored flask. It usually is suitable within a month.

2. Hydroxylamine hydrochloride 5% solution in water.

3. Glycerin (used as a protective colloid).

4. Compensating solution containing the ions of calcium, aluminum and manganese. 4.4 gr of calcium acetate, 0.34 gr of manganese sulfate and 0.37 gr of aluminum sulfate are inserted into a 1-liter volumetric flask. Then 10 ml of concentrated hydrochloric acid and about 600 ml of water are added; the mixture is stirred until the salts are dissolved, it is brought to the mark by adding water and then stirred again.

5. The mixed reagent is prepared by blending 10 parts of the compensating solution, 10 - glycerin and 2 - hydroxylamine.

6. NaOH 20% solution.

7. Mixed standard solutions 1, 2, 3 and 4.

Prodedure of determination

1. One ml of standard solution and 1 ml of extract are transferred to each cavity of the spot plate.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

2. Then 0.5 ml of mixed reagent and 1 drop of titan yellow solution were added to each cavity and stirred.

3. To the above were added 3 drops sodium hydroxide solution and stirred.

4. The color of the extract obtained is compared with the color of the scale of standard solutions and the comparative results are recorded as per the table:

Number of standard, mark	1	2	3	4
mg Mg in 1 kg of soil	4	10	20	40

DETERMINATION OF CALCIUM

Murexide solution - ammonium salt of purpuric acid has a violet coloring. This reagent with calcium forms a complex yellow compound. When the amount of the reagent is excessive than the solution has an intermediate coloring.

Reagents

1. Murexide solution - 50 mg of murexide solution in 100 ml of 70% ethyl alcohol. The reagent is unstable and is kept in an orange colored flask.

2. Buffer solution - 12 ml of glacial acetic acid and 27.2 of sodium acetate dissolved in 1 liter of water.

3. The mixed reagent is prepared before the analysis by mixing 1 and 2 [illegible] at a 1:3 ratio.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

4. Mixed standard solutions 1, 2, 3 and 4.

Procedure of Determination

1. Standard solutions and extracts in amounts of 0.6 ml are transferred to each cavity of the spot plates.

2. 1 ml each of mixed reagent is added to the above and stirred.

3. The color obtained is compared with the coloring of standard solutions and the results are recorded as per the table:

Number of standard, mark	1	2	3	4
mg of Ca in 1 kg of soil	200	500	1000	2000

DETERMINATION OF AMMONIUM ION

The determination is based on the formation of a stained compound of the ammonium ion with Nessler's reagent. A yellow color bordering on brown is determined by suspended colloidal particles.

Reagents

1. Nessler's reagent. Add 91 gr of mercury biodide, 70 gr of potassium biodide and 224 gr of potassium hydroxide into a 1-liter volumetric flask, add water so as to dissolve all salts, cool and bring mixture to the mark by adding water. The reagent is left to settle its residue for several days,

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

and the transparent solution is poured off. The reagent is kept in an orange colored glass flask.

2. Saturated solution of Seignette's salt (354 gr of salt in 1 liter of water). One ml of chloroform is added to the solution.

3. Gum arabic 5% vegetable solution. Ten gr of powder is dissolved in 195 ml of water. It must be dissolved gradually, adding water in small amounts and stirring thoroughly. 5 ml of Nessler's reagent are added to the solution. It is allowed to stand for several days and the transparent solution is poured off into a brown flask. The reagent is good for about 2 months.

4. Mixed solution of reagent 2 and 3 at 9:1 ratio.

5. Mixed standard solutions 1, 2, 3 and 4.

Procedure of determination

1. 0.5 ml of standard solutions and extracts are transferred to each cavity of the spot plate.

2. 0.5 ml of mixed reagent are stirred into the above.

3. 1 drop of Nessler's reagent is stirred into the same solution.

4. The extract color obtained is compared with the coloring of the standard solutions and is recorded as per the table:

Number of standard, mark	1	2	3	4
mg of N ammonium per kg of soil	10	25	50	100

(To be continued).

* * * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Shorin, V. A., and Rossolimo, O. K.

Izuchenie protivovirusnogo deistviia i lechebnykh svoist antibiotika antivirubina.

[Study of the antivirus activity and therapeutic properties of the antibiotic antivirubin].

Antibiotiki, vol. 1, no. 2, p.47-60, Mar./Apr. 1956. (In AFML)

(In Russian)

A 794

The antibiotic, antivirubin, which is a dark-red pigment, was obtained at the Institute of Research for New Antibiotics, Academy of Medical Sciences, USSR [Institut po Issyskaniiu Novykh Antibiotikov AMN SSSR]; it was isolated for its inhibitive effect upon the development of necroses on the leaves of thorn apple and Nicotiana glutinosa caused by the tobacco mosaic virus. It is almost insoluble in water, but dissolves well in alcohol. Therefore we prepared a basic water-alcohol antibiotic solution containing 2 mg of dry substance in 0.2 ml of alcohol + 5.8 ml of physiological solution for all subsequent experiments. The following dilutions were prepared ex tempore in water or in a physiological solution.

EFFECT OF THE ANTIBIOTIC ANTIVIRUBIN UPON THE TOBACCO MOSAIC VIRUS IN VITRO

The water-alcohol solution of antivirubin was added to the tobacco mosaic virus suspension at a rate that would make the concentration of the preparation equivalent to 500 micrograms/ml or 0.05%. For the purpose of control, diluted alcohol was added to the suspension in the second test tube

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

in the same concentration and in the same volume as to the suspension in the first test tube. Then the suspension was stirred and stored at a 2--4° C temperature. After different intervals of time, the suspensions were used to infect the leaves of N. glutinosa or thorn apple. The virus suspension with the antibiotic was applied to one half of the leaf and the virus suspension without the antibiotic - to the other half. The infected leaves were kept for 4 days at a 25-28° temperature and then the necrotic spots were counted. The results of one experiment[1] are cited in table 1.

The results of an experiment conducted by the same method, except for the one variation that the virus suspensions were kept in a refrigerator at a 25-28° temperature, are cited in table 2.

These experiments indicate the presence of antivirus action in antivirubin. A study of the effect of antivirubin upon other viruses, particularly upon animal viruses, presented much interest. To clarify this question, experiments were conducted with the virus of smallpox vaccine and with the grippe virus.

Table 1.

Effect of antivirubin upon the tobacco mosaic virus at 2-4° temperatures

Duration of virus storage in hours	Virus suspension	Number of necrotic spots on 6 half leaf of N. glutinosa or thorn apple	Percentage of virus survival in suspension with antibiotic as compared with control
20	With antibiotic	25.8	43.1
	No antibiotic	59.4	
48	With antibiotic	6.5	22.2
	No antibiotic	29.2	
96	With antibiotic	25.5	17.3
	No antibiotic	147.1	

[1] The figures cited in tables 1 and 2 are the average for 4-6 leaves.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 2.

Effect of antivirubin upon tobacco mosaic virus at 25-28° temperatures

Duration of virus storage in hours	Virus suspension	Number of necrotic spots on a half leaf of N. glutinosa or thorn apple	Percentage of virus survival in suspension with antibiotic as compared with control
72	With antibiotic	1.6	5.8
	No antibiotic	26.0	
96	With antibiotic	1.0	3.3
	No antibiotic	30.0	

EFFECT OF ANTIVIRUBIN UPON VIRUS OF SMALLPOX VACCINE

A total of 3 experiments were conducted and they produced very similar results. We are citing the data of one of them. A suspension which contained one part of virus to 50 parts of physiological solution was prepared from a dry virus of smallpox vaccine grown on a chorion-allantoid [khorion-allantoidnyi] membrane of a chicken embryo. The antivirubin concentration in virus suspensions equalled 250, 50 and 10 micrograms/ml which amount to 0.025, 0.005 and 0.001%, and the virus concentration - 1%. The virus suspension with the antibiotic and the control suspension with a pure alcohol solution were kept for 6 hours at room temperature. The amount of living virus in suspensions determined by the conventional method of injecting a rabbit intradermally. The intensity of skin reactions was noted after the virus suspension was injected. (table 3).

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 8.

Effect of antivirubin upon virus of smallpox vaccine

Concentration of antibiotic in virus suspension in micrograms/ml	Dilution of virus suspension						
	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-7}	10^{-8}
250	++	++	+	+	0	0	0
50	++	++	++	+	+	0	0
10	++	++	++	++	+	+	0
0 (control)	++	++	++	++	+	+	±

LEGEND. (+ +)--infiltrate one diameter more than 12 mm, (+)--infiltrate from 9 to 11 mm, (±)--infiltrate less then 9 mm, (0)--infiltrate absent.

The data cited in table 8 show that, at a 6-hour contact in a 250 micrograms/ml concentration, antivirubin reduces the virulence of the smallpox vaccine virus almost 1000 times, in a 50 micrograms/ml - 100 times and in a 10 micrograms/ml - 10 times. Antivirubin exerts a more severe action upon the smallpox vaccine virus than upon the tobacco mosaic virus.

EFFECT OF ANTIVIRUBIN UPON THE GRIPPE A_1 VIRUS

The antibiotic concentration in the virus suspension equalled 250 micrograms/ml, 50 micrograms/ml and 10 micrograms/ml, and the dilution of the virus suspension - $6 \cdot 10^{-4}$. The virus suspension combined with the corresponding amounts of physiological solution and alcohol served as control. Six hours after the mixtures had been prepared, the suspensions were diluted 50 times (the virus concentration 10^{-5}). Each suspension was used to infect intranasally a separate group of 10 mice. For ten days the mice were kept under observation and then the surviving animals were killed. The degree of their lung infection was noted upon their dissection.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 4.

Effect of antivirubin upon grippe virus in vitro

Control suspension	Suspension containing antivirubin in concentrations of:		
	250 micrograms/ml	50 micrograms/ml	10 micrograms/ml
Number of mice			

Perished in first 10 days	Presence of specific lung infection	Perished in first 10 days	Presence of specific lung infection	Perished in first 10 days	Presence of specific lung infection	Perished in first 10 days	Presence of specific lung infection
6/10	10/10	0/9	0/9	1/10	6/10	8/10	9/10

Note. Denominator - number of experimental animals, Numerator - number of mice perished or mice with specific lung infection.

According to table 4, a grippe virus in a solution that contains 250 micrograms/ml of antivirubin either dies or loses its virulence completely after a 6-hour contact. As the concentration of the antibiotic decreases, its action upon the grippe virus decreases in proportion. A second experiment conducted by the same method produced analogous results.

THERAPEUTIC EFFECT OF ANTIVIRUBIN UPON A SPECIMEN OF THE GRIPPE VIRUS IN WHITE MICE

The toxicity of antivirubin injected daily subcutaneously into white mice weighing about 15 gr was within 5 days the following.

The observations cited indicate that antivirubin possesses high toxicity.

24-hour dose in mg/kg	Percentage of mice which perished within 5 days following injections
6.6	75
3.3	50
1.7	0

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

When mice infected intranasally with the grippe virus (dilution of suspension of infected lungs 10^{-6}), were treated with antivirubin injected once a day for 5 days in amounts of 100 micrograms, 50 micrograms and 25 micrograms per mouse (6.6, 3.3 and 1.7 mg/kg), it was found that the preparation possessed therapeutic action. Thus, it manifests itself more severely on the virus of smallpox vaccine than on the tobacco [mosaic] virus [when applied at] the rate of 6.6 mg/kg; an effort to establish the presence of the virus in lungs by means of agglutination reaction of chicken erythrocytes was not successful. There was very little virus in the lungs of mice which had been injected with antivirubin at the rate of 3.3 mg/kg per day [24 hours], and considerably more when treated with antivirubin in doses of 1.7 mg/kg. Virus content in the lungs of control animals was very considerable; agglutination of chicken erythrocytes in a dilution of 1:320--1:1280. However, most chickens which received 100 or 50 micrograms of antivirubin per day died as a result of the toxic properties within the preparation. Antivirubin in doses of 25 micrograms per mouse proved little effective. Thus, these observations indicate that although antivirubin possesses therapeutic action in experimental grippe, it is too toxic to treat virus diseases.

It is interesting that antivirubin fails to kill the bacteriophage of B. aerogenes even in concentrations up to 200 micrograms/ml at a contact lasting 24 hours. This indicates once more that the use of bacteriophages for the isolation of antibiotics possessing antivirus properties is unjustified.

Antivirubin exerted no influence upon the development of Kroker's sarcoma in mice either in tolerable doses or in subtoxic doses.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

CONCLUSIONS

1. Antivirubin applied in concentrations of 0.01--0.005% (100-50 micrograms/ml) inactivates in vitro the viruses of tobacco mosaic, smallpox vaccine and grippe.

2. Antivirubin is toxic for mice. When injected subcutaneously every day at the rate of 100 micrograms per mouse (6.6 mg/kg) for 5 days, it causes approximately 75% of animal mortality. Injections of 10 micrograms of antivirubin per mouse (1.7 mg/kg) a day for a period of 5 days causes no animal mortality. Only toxic or subtoxic doses of the preparation exert therapeutic action in experimental grippe infection of mice.

3. Antivirubin does not kill the bacteriophage of Aerobacter aerogenes.

4. Injection of antivirubin does not change the course of Kroker's sarcoma in mice.

Institut po Izyskaniiu Novykh Antibiotikov AMN SSSR [Institute of Research for New Antibiotics, Academy of Medical Sciences, USSR]

* * * * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Concerning measures for kolkhozes and sovkhozes in switching over to planting hybrid seed.

Kolkhoznoe Proizvodstvo, vol. 16, no. 6, p.12. May 1956. 281.8 K83.

(In Russian)

A 795

Present day science and the experience of the country's leading kolkhozes and sovkhozes have proved that switching over to planting hybrid seed is an important source of raising the productivity and of increasing the total grain yield of maize.

For the purpose of aiding kolkhozes and sovkhozes in their transition to planting maize from hybrid seed, the following procedure and organization for growing hybrid seed of maize have been established by the order of the Ministry of Agriculture, USSR, issued March 19 of the current year [and titled] "Concerning measures for kolkhozes and sovkhozes in switching over to planting maize from hybrid seed".

Production of seed of self-pollinated lines which will insure the production of seed of single inter-linear hybrids, and also of elite seed of regionalized varieties of maize and of varieties that constitute the parent forms of line varietal [sortolineinyi] and intervarietal hybrids will be carried out by scientific-research institutions until the transition to planting maize from seed of interlinear hybrids is completed.

Production of seed of single interlinear hybrids of the first generation [aiming] to satisfy fully the requirements of hybridization plots, and also seed of parent forms of regionalized intervarietal and line varietal hybrids, of regionalized varieties and hybrid populations will be carried out by specially selected seed growing sovkhozes.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Production of seed of interlinear hybrids of maize to provide fully all kolkhozes and sovkhozes with hybrid seed of the first generation, and also seed of first generation regionalized intervarietal and line varietal hybrids, of varieties and hybrid populations will be carried out by specially selected seed growing sovkhozes and kolkhozes.

Scientific-methodical guidance of sovkhozes growing hybrid seed of maize, and inspection of the quality of these seed will be the responsibility of the All-Union Scientific-Research Institute for Maize.

This Institute and the experimental-selection institutions transferred to it are obligated to develop highly productive interlinear hybrids better adapted to local conditions, resistant to lodging and diseases, early ripening and cold-resistant, possessing high, economically valuable properties, and also interlinear maize hybrids with sterile pollen on the maternal plants; [they are obligated] to grow seed of self-pollinated lines and to conduct seed growing work with regionalized varieties; to work out more effective methods for the cultivation of maize, applicable to the districts of the institute's activities, for the mechanization of all operations involved in growing maize for seed, for the use of chemical weed control, etc.

Special departments for the selection and growing of maize seed, with a staff of no less than 2-3 scientific workers and the required technical personnel, are being established in zonal scientific-research institutes and at State selection and experimental stations that conduct selective seed-growing work for maize; the position of a seed growing agronomist is being created on seed sovkhozes and kolkhozes engaged in the production of hybrid seed of maize.

The beginning of summer vacations for students of advanced agricultural schools and of intermediate professional schools [tekhnikum] has been postponed until August to permit their recruiting for the work of pulling tassels

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

off maize on hybridization plots.

The Ministry of Agriculture, USSR, the Ministry of Sovkhozes, USSR and the Ministry of the Food Industry, USSR, will be responsible for paying the workmen engaged in pulling off tassels of maternal maize plants at a double rate of the wage scale established on sovkhozes for second-class workers.

Kolkhozes are encouraged to pay in money for the services of persons recruited for tassel pulling of the maternal plants of maize, but for kolkhozniks to count the work-days double. Payments in cash and the counting up of work-days are to be carried out after the work has been inspected by the seed growing agronomist.

When hybrid maize seed has to be prepared then, in addition to the price for row maize, payment will be effected [also] per centner of seed:

a) for self-pollinated lines and single, first generation hybrids: 1st class - 275 rubles, 2nd and 3rd classes - 250 rubles;

b) for regionalized double inter-linear hybrids of the first generation: 1st class - 150 rubles, 2nd and 3rd classes - 125 rubles;

c) for regionalized line varieties and intervarietal hybrids of the first generation: 1st class - 100 rubles, 2nd and 3rd classes - 85 rubles; for seed of single hybrids of the second generation and hybrid populations payment will be effected at the same rate as for varietal seed of the first and second reproductions.

The Ministry of Procurement [zagotovok] must sell hybrid maize seed to kolkhozes and sovkhozes at the following prices per centner of seed:

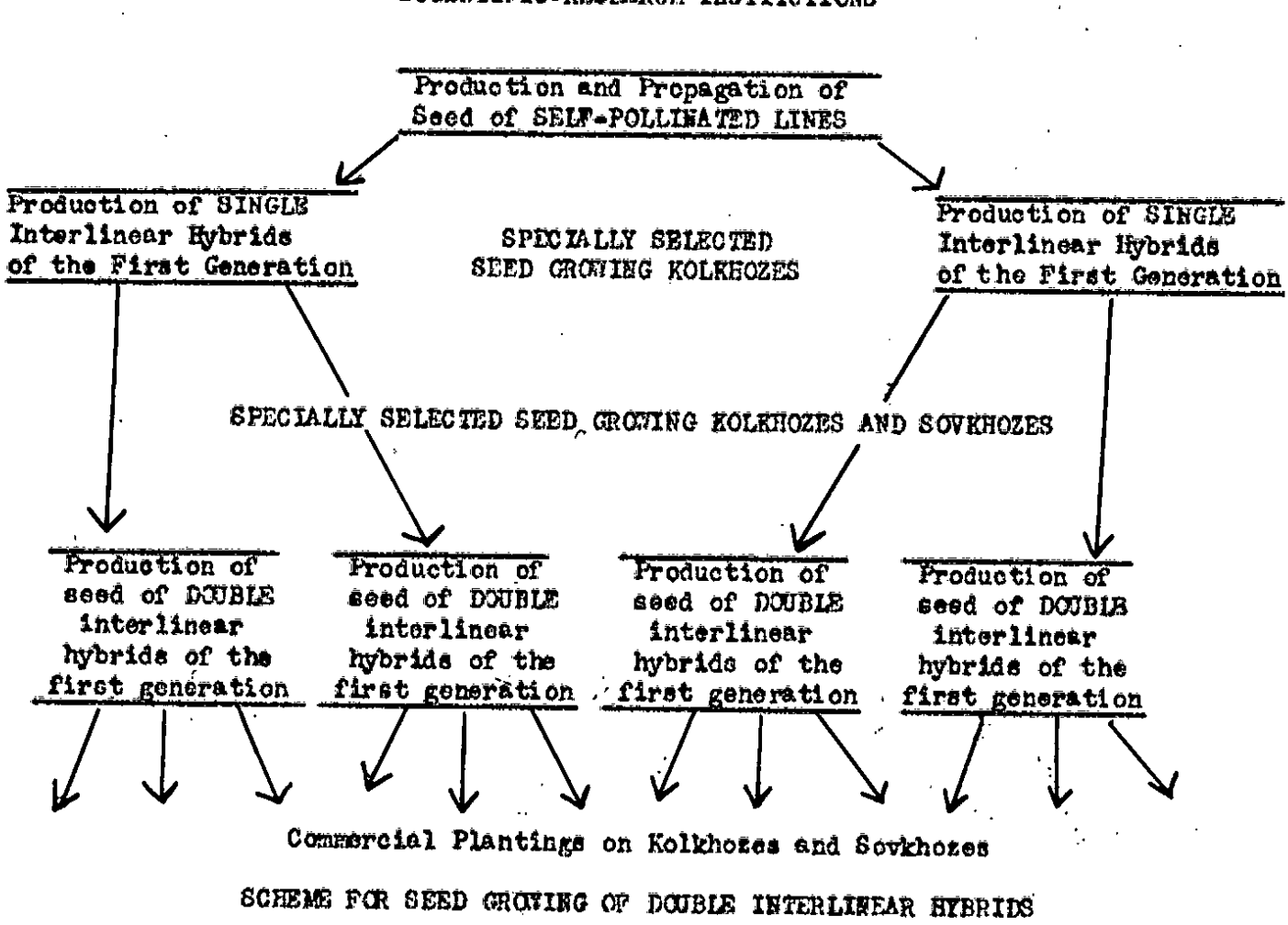
1) seed of self-pollinated lines and of single hybrids of the first generation: 1st class - 350 rubles, 2nd and 3rd classes - 325 rubles;

2) seed of regionalized interlinear hybrids of the first generation: 1st class - 240 rubles, 2nd and 3rd classes - 215 rubles; 3) seed of regionalized line varietal and of intervarietal hybrids of the first generation:

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

1st class - 160 rubles, 2nd and 3rd classes - 165 rubles.



SCHEME FOR SEED GROWING OF DOUBLE INTERLINEAR HYBRIDS

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Kovarskii, A. E., and Chursin, Iu. P.

Materinskaia nasledstvennost' pri mezhsortovoi gibridizatsii kukuruzy.

[Maternal inheritance in intervarietal hybridization of maize].

In Kishinevskii Sel'skokhoziaistvennyi Institut imeni M. V. Frunze. Sbornik rabot po izucheniiu kukuruzy v Moldavii, p.106-126. Moskva, Sovetskaia Nauka, 1956. 69.22 K64

(In Russian)

A 796

CONCLUSIONS (p.126-126)

1. Three-year experimental data obtained under Kishinev conditions on maize hybrids confirm the correctness of I. V. Michurin's proposition concerning the predominance of maternal inheritance in sexual hybridization.

2. Maternal inheritance manifests itself in a number of properties and characteristics of maize: in growth, in the height at which it forms [zakladka] the lower ear, in the number of leaves, in the resistance of maize plants to common smut [Ustilago zeae], in productivity and in the consistency of grain.

3. Varieties best adapted to the given concrete conditions, i.e. primarily local varieties, are to be used as components in intervarietal hybridization of maize and, particularly, as the maternal variety.

4. Intervarietal, especially geographically distant [otdalenno-geograficheskaia], hybridization of maize is very effective as a method of increasing its productivity and of improving its quality, provided that good

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

hybrid pairs are carefully selected for crossing and hybrids, chiefly of the first generation, are utilized in production.

5. In hybrid combinations in which dent varieties of maize are used as the maternal parent [mat'] ears are more distinct as regards morphological characteristics, than in those hybrid combinations in which flint varieties are used as the maternal parent.

6. If local flint varieties of maize produce a much lower yield than imported dent improved by selection, then it is desirable to use the more productive dent varieties as the maternal parent. In such a case the inter-varietal maize hybrids will be more productive, compared with crossings in which low-yield, local flint varieties were used as the maternal parent.

7. Problems of maternal inheritance discovered and tested on maize must be taken into consideration in selective seed growing at the time hybrids are procured and cultivated for the different zones of the USSR.

8. The more important crossing components must definitely be tested in direct and reverse combinations.

REFERENCES

1. Avakian, A. A. Heredity of characteristics acquired by organisms. "Agrobiologiia", No. 7, 1948.

2. Isaev, S. I. Role of maternal plant in the formation of heredity in hybrids. "Agrobiologiia", No. 6, 1948.

3. Kovarskii, A. E. Botanical and varietal composition of Moldavian maize. Tr. Kishinevskogo S.-Kh. Instituta, 1949.

4. Lysenko, T. D. Agrobiologiia, Sel'khozgiz, 1948.

5. Michurin, I. V. Works, v.1-4, 1948.

6. Salamov, A. B. Intervarietal hybridization of maize. "Selektsiia

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

i Semenovodstvo", No. 1, 1947.

7. Salamov, A. B. Backcrossing in maize. "Agrobiologiia", 1948.

8. Sokolov, B. P. Maize hybrids, their procurement and utilization in production. "Selektsiia i Semenovodstvo, no. 1, 2, 1946.

* * * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Kovarskii, A. E., and Borovskii, M. I.

Ispol'sovanie vegetativnykh gibridov kukuruzy dlia tselei selektsii i polovoi gibridizatsii.

[Use of vegetative maize hybrids for purposes of selection and sexual hybridization].

In Kishinevskii Sel'skokhoziaistvennyi Institut imeni M. V. Frunze. Sbornik rabot po issucheniiu kukuruzy v Moldavii, p.177-184. Moskva, Sovetskaia Nauka, 1956. 59.22 K64

(In Russian)

A 797

CONCLUSIONS (p.183-184)

New forms possessing the combined characteristics of scion and stock, and distinguished by constancy and a relative uniformity during the testing period, from 1950 through 1953, were obtained among vegetative hybrids of maize.

Sexual hybrids obtained on the basis of crossing individual families of vegetative hybrids among themselves, or by crossing them with single linear maize hybrids, have shown high productiveness.

The high productivity of such vegetative-sexual hybrids of maize indicates that they could be expected to compete with the best interlinear sexual maize hybrids (for example, VIR-42 and VIR-26).

If it were taken into account that a series of combinations of such vegetative-sexual hybrids of maize excell in early ripening, in ear production in large numbers, and in high-protein flint grain, then their superiority would rise to an even higher degree.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The more simplified seed-growing scheme of reproducing vegetative-sexual hybrids of maize combined with their high productivity, and the comparatively good productivity of their family (parent) components introduce them as good prospects for practical purposes.

On the whole, the Michurin method of combining vegetative and sexual hybridization in the selection of maize should be used widely in scientific agricultural institutions of the USSR.

* * * *

REFERENCES

1. Lysenko, T. D. Agrobiologiia, 1948

2. Michurin, I. V. Works, v. 1-4, 1948.

3. Kovarskii, A. E., and Bruter, D. P. Vegetative hybridization of maize, 1963.

4. Kovarskii, A. E. Remaking the nature of agricultural plants by the method of vegetative hybridization (report read at the meeting of the Botanical Society of the Moldavian Republic, October 1953). Kishinev, 1953.

* * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Uchkovskii, V. G.

Geograficheski otdalennaia gibridizatsiia kukuruzy (itogi rabot 1952-1954).

[Geographically distant hybridization of maize (results of work, 1952-1954)].—

In Kishinevskii Sel'skokhoziaistvennyi Institut imeni M. V. Frunze. Sbornik rabot po izucheniiu kukuruzy v Moldavii, p.185-190. Moskva, Sovetskaia Nauka, 1955. 69.22 K64.

(In Russian)

In the works of I. V. Michurin, geographically distant crossing of plants occupies much space. This method was used to create his famous varieties of Bere Zimniaia Michurina, Kandil'-Kitaika, Surrogat Sakhara and others. In his work "Concerning the substance of my works [O sushchnosti moikh rabot]", I. V. Michurin speaks of the poor capacity of hybrids [metis] of two closely related varieties of one plant species to adapt themselves, and he proceeds to write: "in contrast, all hybrids obtained by crossing plants of two distinct species, or of two varieties of one species, but far removed from each other by the locale of their native land, always possess the greatest possible capacity to adapt themselves to the conditions of life in a new locality". In a communication [addressed] to] "To the Voronezh Oblast Administration" I. V. Michurin said: "In crossing two selected parent plants, the best results are obtained in those hybrids whose parents are brought from their native lands where climate as well as soil conditions are as different as possible.

A 798

Under the supervision of Professor Kovarskii, using the method which he had proposed, we in 1952, began to work on geographically distant hybri-

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

dication of maize at the Experimental Selection Base. The first year we used for crossing a small selection of varieties from the world collection of VIR [All-Union Institute of Plant Industry]. The geographically distant maize hybrids which we developed in 1962 were tested in 1963 under field conditions. The method employed was the following: dimensions of test plot 14 m^2; each hill had 1-2 plants (density of stand - 30 thousand plants per hectare).

The results demonstrated that the method selected was precisely the right one: only 8 combinations displayed a productivity below the average of both parents, [Begin p.186] 2 equalled the parents; 47 combinations, or 82% of geographically distant hybrids surpassed the average yield of the parents by 10, 20, 50% and more (table 1). The best hybrids surpassed also the yield of the standard variety and, by virtue of this proved to be economically valuable for Moldavia.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 1.

Yield and vegetative period of geographically distant hybrids of maize (1955)

No. in Consec. Order	No. of test plot	Name of Variety	Veget. period (days)	Yield c/ha	% of standard	% of average parent
1	11	♀ Local Siberian [Mestnaia Sibirskaia] from Kirgiz	87	12.1	42.5	-
2	12	Hybrid Local Siberian x Dnepropetrovskaia	95	39.6	139.0	126
3	13	♂ Dnepropetrovskaia	108	26.8	111.0	-
4	19	♀ Ecol. 886 from Kirgiz	87	19.6	80.4	-
5	20	Hybrid Ecol. 886 x Dnepropetrovskaia	96	34.6	142.0	158
6	139	♀ Voronezhskaia	84	16.8	68.7	-
7	140	Hybrid Voronezhskaia x Mold. Oranzhevaia	88	36.1	148.0	189
8	141	♂ Mold. Oranzhevaia	110	21.4	89.3	-
9	164	♀ Minnesota 13 Extra	104	22.9	76.0	-
10	165	Hybrid Minnesota x Spasovskaia	99	30.5	118.0	184
11	166	♂ Spasovskaia	89	20.7	80.5	-
12	122	♀ Gehu - Canada	83	6.0	26.0	-
13	123	Hybrid Gehu - Zheltaia Uzbekskaia	91	25.0	80.0	288
14	124	♂ Zheltaia Uzbekskaia	110	18.2	62.4	-
15	72	♀ Mais Grande - Chile	116	19.6	73.9	-
16	73	Hybrid Mais Grande x Sary Makoe	111	34.0	122.0	220
17	75	♂ Sary Makoe - Uzbekistan	114	11.2	35.6	-
18	16	♀ Belaia / Zheltaia - Kirgiz	94	9.6	38.6	-
19	17	Hybrid Belaia / Zheltaia x Dnepropetrovskaia	103	37.3	142.0	214
20	18	♂ Dnepropetrovskaia	108	25.3	95.4	-

A series of the hybrids obtained had a shorter vegetative period than the most early-ripening parent.

In 1954, we, using the method of the frequency standard, seeded 250 maize hybrids developed in 1953 by crossing a large collection of maize of diverse origin obtained from the All-Union Institute of Plant Industry with a selection of flint and dent varieties. In crossing, flint components were blended [podbiralis'] with dent varieties.

In 1954, the large collection of hybrids and the inadequate cropping area under maize forbade the seeding of parent varieties next to the hybrids. However, the use of the comparative pair method and a comparison with the highly productive VIR-42 hybrid, which was seeded after every 10

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

hybrids in the experiment, justifies our considering the testing results as being completely objective. [Begin p.187]. Investigation results which corroborate more clearly the principle of geographically distant hybridization of maize are cited in table 2.

Table 2.

Yield and vegetative period of geographically distant hybrids of maize (1954)

No. in consec. order	No. of test plot	Hybrid	Veget. period in days	Division from standard	Yield c/ha	% of standard	%of VIR-42
1	36	Staritskaia (Ukrainian SSR) x Dnepropetrovskaia	100	-	38.6	116	92
2	61	Portokaliu 65 x Moravskaia (Czechoslovakian)	99	- 1	39.4	114	100
3	64	Chinkvantino 84 x Chinkvantino (Germany)	93	- 8	46.6	116	116
4	89	Northwestern x Dzhouri (Afghanistan)	93	- 8	31.7	111	91
5	90	Dzhouri (Afghanistan) x Dnepropetrovskaia	91	- 10	34.0	120	98
6	98	Selekti rana (Zakarp.) x Dnepropetrovskaia	92	- 8	36.0	114	94
7	147	Semi-Dent 115 x Funk (USA)	108	+ 8	38.4	128	106
8	159	Zakarpatskaia x Northwestern (USA)	100	- 8	38.5	116	106
9	178	Samyi rannii (Sev. Osetiia) x Dakota White Flint (USA)	100	- 4	35.0	113	90
10	180	Zolotaia Praga x Northwestern (USA)	100	- 2	41.3	137	107
11	215	Ekologicheskii 886 x Dnepropetrovskaia	95	- 5	41.8	124	109
12	216	Chakinskaia x Dnepropetrovskaia	95	- 5	39.2	118	103
13	219	Voronezhskaia x Mold. oranzhevaia	92	- 8	38.7	120	102
14	222	Flint White / Yellow (Kirgiz) x Dnepropetrovskaia	95	- 4	44.6	131	118
15	224	Selekti rana (Zakarp.) x Northwestern (USA)	95	- 4	37.2	124	98
16	228	Gelber Landmais (Czechosl) x Dnepropetrovskaia	95	- 5	34.9	113	96

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The circumstance that attracts attention is the economically extremely important criterion that practically all hybrids ripen earlier than Dnepropetrovskaia. Many of them surpass the hybrid VIR-42 in point of productivity - especially No. 14. Several of the best hybrids which produced a very high yield in 1953 as well as in 1954 are cited in table 3. [Begin p.188]

Table 3.

Yield of the best geographically distant hybrids of maize (1953-1954)

No. in consec. order	Hybrid	Vegetative period (average)	Yield		Average for 2 years	% of standard
			1953	1954		
1	Dnepropetrovskaia (standard)	102	25.1	34.8	30.0	100.0
2	Ekologicheskii 886 x Dnepropetrovskaia	95	34.6	41.3	38.0	132.9
3	Chakinskaia x Dnepropetrovskaia	91	30.3	39.2	34.7	119.6
4	Voronezhskaia x Mold. oranzhevaia	90	36.1	38.7	37.8	133.0
5	Minnesota 23 x Kubanskaia konservnaia	96	34.7	44.6	40.0	134.0
6	Flint White / Yellow x Dnepropetrovskaia	98	37.5	44.6	41.0	136.0

Unfavorable conditions for maize growing in the year 1954 made it impossible for the later [ripening] hybrids to exhibit their potentialities with regard to high yields. Many late varieties, however, proved capable of producing high yields of green mass (stems and ears); this indicates that they can be grown for silage. Some of these data are cited in table 4.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 4.

Yield of green mass of some geographically distant hybrids of maize (1954)

No. in consec. order	Hybrid	Yield of green mass c/ha	% of standard
1	Dnepropetrovskaia (standard)	234	100
2	Valtichka (Czechosl) x Maiz Kurakhua (Chile)	345	147
3	Valtichka x Funk 90-day (USA)	336	143
4	Tsorosob Roshl' (Armenia) x Gurney's Early (USA)	373	160
5	Semi-Dent KSKhI [Kishinev Agricultural Institute] Risovaia Belaia	310	132

On the Basis of the above statement, the following conclusions can be drawn:

1. Geographically distant crossing is a means of creating highly productive hybrids of maize which are capable of competing with the hybrids of VIR-42 and VIR-26, which thus far have been unsurpassed in Moldavia.

Since geographically distant hybrids are semi-dent or flint, i.e. [maize] with a large percentage of protein, they make better fodder for livestock than the hybrids of VIR.

2. Geographically distant crossing is the best method for developing early ripening hybrids with high productivity which can be used successfully as a preceding crop for winter crops.

3. With the aid of geographically distant crossing it is possible to create highly productive maize hybrids for silage.

Fig. 1. Ears of the maize varieties of Selekti Rana (Czechoslovakia) and Northwestern (USA) and of their hybrid - Kishinevskii 37.

Fig. 2. Ears of the maize varieties Chakinskaia (Tambov) and Dnepropetrovskaia (Ukranian SSR) and of their hybrid - Kishinevskii 40.

* * * * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Trans. A-799
(In full)
vg/A

Sidorov, M. I.

Predislovie.

[Foreword].

In Kishinevskii Sel'skokhoziaistvennyi Institut imeni M. V. Frunze. Sbornik rabot po izucheniiu kukuruzy v Moldavii, p.5-6. Moskva, Sovetskaia Nauka, 1955. 59.22 K64.

(In Russian)

Moldavia is one of the oldest maize growing regions of our country.

The abundance of light and heat and a long frost-free period facilitate the successful cultivation of maize in this region. During its long culture the population of Moldavia has accumulated rich experience in growing and utilizing this most important crop of the Republic. In prewar years maize occupied 25-30% of the entire cropping area of Moldavia, and in the next few years the area seeded to maize will be brought to 35%.

A 799

The efforts to expand the fields under maize, the loving attitude toward this crop are connected with its enormous value.

Under conditions of the dry steppe climate of Moldavia, maize produces high, stable yields, utilizes well summer precipitation, and recovers rapidly from the effects of a prolonged drought. As a result of this, maize is an "insurance" crop [strakhovaia kul'tura]. Under conditions of peasant farms often exposed to the effects of drought, this crop has always provided bread for the family and fodder for livestock when bad years occurred. Maize is an excellent preceding crop for all crops that are planted after it. It is by nature one of the highly productive crops, its

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

organic mass is fully consumed.

In consideration of the above, the staff of professorial instructors of the Kishinev Agricultural Institute has, for a number of years, been conducting work on the biology, selection, agrotechnics and mechanization of maize. A series of works on these problems has been published in the Proceedings of the Institute. Work connected with the study of maize has been conducted by the faculties of selection and Darwinism, agriculture, plant culture, agrochemistry, botany, agricultural machinery, feeding of farm animals, and vegetable culture, and by experimental stations - Experimental Selection Station - field crop cultivation and animal husbandry.

Students have widely been attracted to the study of maize and a number of their works are published in this Collection.

Scientific-research work on the biology and selection of maize is developed most extensively by the Faculty for Selection and Darwinism and by the Experimental Selection Station headed by the esteemed scientist of the Moldavian SSR, Professor Doctor of the Agricultural Sciences, A. E. Kovarskii.

The basis of the works incorporated in this collection underlie the principles of Michurin's agrobiological science. Their aim is to investigate more profoundly and more thoroughly one of the valuable, widely cultivated plants and, on this basis, to make their own contribution toward the implementation of the historic decrees issued by the January Plenum of TSK KPSS [Central Committee of the Communist Party of the Soviet Union].

M. I. Sidorov, Director
Kishinev Agricultural Institute

Kishinevskii Sel'skokhoziaistvennyi Institut

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Poliakov, Iu. A.

Temperaturnye i energeticheskie kharacteristiki ionoobmennykh reaktsii v pochvakh.

[Temperature and energy characteristics of ion-exchange reactions in the soils].

In Akademiia Nauk. Doklady VI Mezhdunarodnomu Kongressu Pochvovedov. 2d Komissia -- Khimiia pochv., p.127-137. Moskva, 1956. (Not in USDA)

(In Russian)

In view of the well known role which they play in the processes of plant feeding and in soil formation, the ion-exchange reactions were subjected of late to very considerable research. As a result of this research not only abundant factural material was collected, but also many great theoretical generalizations and discoveries, which are on the level with the latest attainments in natural science. And yet there are many problems, concerning the nature and mechanism of related phenomena, which remain disputable and not sufficiently investigated. In the this work, which was completed under the direction of I. N. Antipova-Karataeva, the basic criteria of equilibrium of the exchange adsorption of the ions K^+, NH^+_4, Ca^{++}, NH^+_4 are analyzed, and gives a calculation of the most important thermodynamic characteristics (ΔH_{298}, $\Delta F°_{298}$, $\Delta S°_{298}$). We want to mention, that the changes H, F, S in case of increase of these functions are always considered as positive (at an exothermic reaction $\Delta H < 0$).

A 800

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Objects and Methods of Research

Our research was conducted on podzolic soils and on heavy chernozems. Specimens of these soils were saturated with K^+, and Ca^{++} ions; they were ground and put through a sieve (d= 0.4 mm). For all variants of experiments we took similar weighed portions (2g). The weighed portions were put into flasks and treated with solutions of ammonium chloride. The experiments were conducted at a constant ionic strength of the solution ($I \approx 0.1$), with a tenfold replication. The quantity of NH^+_4 ions was evaluated experimentally in a liquid phase. Other data, which were needed for the evaluation of the equilibrium criteria, were obtained by means of calculations.

Constants of the exchange of ions K^+, NH^+_4, and Ca^{++}, NH^+_4 were calculated according to Nikol'skii's equation [1]. [Begin p.188]

Influence of temperature

As it was repeatedly mentioned in literature [2], the influence of temperature on ion-exchange reactions in the soils has been studied very little. If one has in view those ions, which are examined here, this influence cannot, probably, be great.

In any case, during an exchange of ions of similar valency in glauconite [3] and in soils [4], changes of temperature did not produce any notable influence on the value of the equilibrium constant. During the exchange of ions of different valency, for instance Ca^{++} and Na^+, the rise of temperature causes a certain increase of the equilibrium constant, yet this increase is quite insignificant [2]. Thus, the comparatively few data, which are found in literature, show that, with changes of temperature

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

conditions, the criteria of equilibrium of ion-exchange reaction either does not change at all, or changes in very limited bounds.

We studied the influence of temperature on the exchange of ions K^+, NH_4^+ at 18°, 40° and 70° C. Experiments for two first temperatures were conducted in a thermostatic chamber, where the needed temperature was kept up with a correctness $\pm$ 0.5°. Experiments at 70° were carried out with the aid of an apparatus which is shown in Figure 1.

Title of figure one (on page 189). An apparatus for evaluation of the equilibrium constant at different temperatures.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The apparatus is made of hard glass or of quartz. It works on a simple principle. The lower part of the apparatus is filled with liquid, which is heated with a Nichrome spiral up to a boiling temperature. The steam of the boiling liquid encircles the tube in which the reaction is conducted, and then enters the coolers. Here the working liquid condenses and flows back into the reservoir, where the spiral is situated. The separation of specimens is conducted with the aid of a stop-cock; the temperature is measured with a thermometer, which is within the tube. Experimental data are cited in table. 1.

Table 1.

Determination of the equilibrium constant of the exhcange adsorption of ions K^+, NH_4^+ at temperatures of 18, 40, 70° C.

T=18°	T=40°	T=70°	Remark
1)0.374	4)0.374	7)0.289	$K = \frac{(NH_4^+)\cdot K^+}{(K^+)\cdot NH_4^+}$
2)0.366	5)0.347	8)0.409	
3)0.322	6)0.392	9)0.408	
K_{med}=0.354	K_{med}=0.371	K_{med}=0.368	

[Begin p. 189]

The table shows that the equilibrium constant is determined the most successfully at 70°. A mean deviation γ_{med} here was 4.8%, the maximum γ_{max} = 6.6. The order of values γ_{med} and γ_{max} shows, that a degree of constancy of the constant and the authenticity of those data, which were utilized for its calculation do not exceed the limits of values, which are the most typical for exact, one can even say, for precise measurements of any other physical values. The equilibrium constant at 18° is determined somewhat rougher. But here also a dispersion of individual values, relative to its mean value, is comparatively small (γ_{med}= 6.0%, γ_{max} = 18.2%).

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The equilibrium constant at 40° of temperature was the least precisely determined.

Here $\gamma_{med.} = 14\%$, $\gamma_{max.} = 22\%$. [Begin p.190]

Let us return to data of tabl 1. These data show that in the limits of 18-70° the equilibrium constant of the exchange adsorption of ions K^+, NH_4^+ practically does not change its numerical value. It is true that in a formal comparison of the mean arithmetical values of this magnitude one can note its increase with the rise of temperature. Yet this increase is so insignificant, that it does not exceed the limits of the experiment's errors.

This circumstance permits one to make a conclusion that the equilibrium constant during the exchange of ions of potassium and ammonium in soils does not depend on temperature.

As it was already pointed out, we studied the influence of temperature on the exchange of ions Ca^{++}, NH_4^+ on two varieties of deep chernozems. The equilibrium constant (K) was determined by two separate methods: with the aid of radioactive isotope Ca^{45}, which permits one to find numerical values of the equilibrium constant on a basis of data on the change of activity of Ca^{45} in an initial and in a balanced solutions [5], and in the usual way, on the basis of data of analysis of content of ions NH_4^+ and Ca^{++} in the liquid and the solid phases. The experiments were conducted at 15, 20, 30 and 70°. The equilibrium constant (K) was calculated according to Nikolskii's equation, which in the case under consideration takes the following shape:

$$K_{2-1} = \frac{(NH_4^+) \cdot Ca^{++}_{1/2}}{(Ca^{++}_{1/2}) \cdot NH_4^+}, \quad (1)$$

Where (NH_4^+), $Ca^{++}_{1/2}$ and NH_4^+, $Ca^{++}_{1/2}$ denote balanced amounts of ions

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

of ammonium and of potassium, which are present respectively in solid and liquid phases.

Pertinent data are given in table 2. When treating the table data statistically, part of variants were rejected because the numerical values of K here were either very low or very high (compared to the most probable values of this magnitude). One can judge about the degree of stability of a constant on the basis of statistical characteristics ($\tau_{med.}$ and $\tau_{max.}$), which are given in the table. Comparison of these characteristics shows that dispersion of individual values of the constant, relative to its median value, attains the most substantial dimensions in that series of researches, which was conducted with temperatures of 15° and 20°.

A more stable value K (compared to the foregoing) was obtained at a temperature of 30° and the most stable - [Begin p.191] at a temperature of 70°. It is easy to illustrate a comparative stability of K also by comparing the curves which are obtained during a graphic derivation of functions

$$\frac{(NH_4')}{(Ca\ //\ 1/2)} = f\ \frac{(NH_4')}{(Ca\ //\ 1/2)},$$

which are taken respectively for 15°, 30°, and so on.

Graphs of these functions are given in figure 2. They show that the curved functions have a form of straight lines. Consequently, between the variables

$$\frac{(NH_4')}{Ca\ //\ 1/2} \quad \text{and} \quad \frac{(NH_4')}{(Ca\ //\ 1/2)}$$

there exists a linear dependence, that is why K can be determined trigonometrically (as a tangent of an angle).

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 2.

Numerical values of a constant of Ca^{++}, NH_4^+ exchange

T = 15°		T = 20°		T = 30°		T = 70°	
Variants	Numerical values	Variants	Numerical values	Variants	Numerical values	Variants	Numerical values
103a	0.102	103	0.142	55	0.175	21	0.275
104a	0.06	104	0.165	56	0.166	22	0.273
105a	0.16	105	0.156	57	0.159	23	0.286
106a	0.183	106	0.211	58	0.142	24	0.280
107a	0.168	107	0.159	59	0.161	26	0.250
108a	0.165	108	0.164	60	0.187	26	0.298
109a	0.170	109	0.171	61	0.194	27	0.370
110a	0.217	110	0.218	62	0.253	28	0.232
111a	1.921	111	0.061	63	0.191	29	0.268
112a	0.098	112	0.089	64	0.264	30	0.201
113a	0.123	113	0.476	65	0.212		
114a	0.132			66	0.227		
115a	1.130			67	0.350	K_{med}	0.258
		K_{med}	0.157				
K_{med}	0.150			K_{med}	0.177		

[Begin p.192]

Title of figure 2. Graph of curves. [Begin p.193].

Let us now compare the numerical values of constants found at different temperatures. Let us define these constants respectively as $K_{15°}$, $K_{20°}$, $K_{30°}$, $K_{70°}$. Then, on the basis of data in table 2, we can write

$$K_{15°} = 0.150$$

$$K_{20°} = 0.157$$

$$K_{30°} = 0.177$$

$$K_{70°} = 0.258$$

We see that the value of the equilibrium constant changes with the change in temperature. In the range between 15-30° this change remains within the limits of errors of the experiment, that is the reason why, when calculating an equilibrium constant which does not require great accuracy

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

this circumstance can be disregarded, and one assumes that K practically does not depend on temperature. In the range between 30-70° the change of K had a fully authentic character, yet here also the numerical value of this change is very small. Thus, in the range of those temperatures with which we have to work in the upper layers of the soil, the balance of the reaction under consideration practically does not change with a change in temperature.

Determination of thermodynamic characteristics ($\Delta H, \Delta F^{\circ}, \Delta S^{\circ}$)

Thermodynamic characteristics of exchange reactions can be determined by various methods. We determined these characteristics by calculations, proceeding from numerical values of exchange constants. Yet certain thermodynamic characteristics (for instance ΔH) can be found experimentally. In such a case one can take a reverse route, that is calculate the equilibrium constant proceeding from the numerical value of thermodynamic characteristics. In a relative comparison of constants, which were found experimentally and those which were calculated theoretically a problem is easily solved about the reliability of methods, which are utilized in ion-exchange reactions, and about the authenticity of those data, which characterize the ion-exchange balance. Yet the importance of thermodynamic characteristics is not thus exhausted. They can also be utilized for clarification of the reversibility of ion-exchange reactions. It is sufficient for this to calculate these characteristics for a forward and a reverse course of the reaction and to compare their numerical values. In case of reversibility they will be equal or very close to each other, but of course, they will be reverse in charge. In a case of [Begin p.194] irreversibility their numerical values will be different (and practically irrational). Of late, the thermodynamic characteristics have begun to be

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

drawn for studies of the nature and mechanism of ion-exchange reactions on organic zeolites [6], resins [7,8] and soils [9,10,11]; of the composition of absorbed bases in various soils [12], of the effectiveness of potassium fertilizers and of lime on soils with different contents of total and exchangeable potassium [13], as well as for a clarification of certain problems of the water balance of soils [14] and plants [15].

Determination of ΔH_{298}

The changes in heat content of ion-exchange reactions can be calculated according to the known equation of Vant-Hoff:

$$\frac{d \ln k}{dT} = \frac{\Delta H}{RT^2} \qquad (2)$$

Our experiments, which were conducted for evaluation of a dependence between K and T, have shown, that during an exchange of ions K^+, NH_4^+ the equilibrium constant (in those ranges of temperatures, which were examined above) practically does not depend on temperature. Consequently

$$\frac{d \ln k}{dT} = 0 \qquad (3)$$

It is easily seen by comparing this phrase with the previous one, that

$$\Delta H_{298} = 0.$$

Thus, reactions of exchange of ions K^+, NH_4^+ in soils proceed without a noticeable heat effect.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The same can also be said about the exchange of ions Ca^{++}, NH_4^+, if one studies this reaction in a comparatively narrow range of temperatures (or, if no great accuracy is required for the evaluation of ΔH_{298}). For a precise determination of this value one can use the Vant-Hoff equation, the integration of which in the limits of two temperatures, corresponding, for instance, to the first and third variants of experiments, gives

$$\Delta H_{298} = 1430 \text{ calories.}$$

The value ΔH proved to be quite small. If one considers that it was evaluated with a precision of $\pm$ 500-600 calories, then it will be apparent, that the order of this value hardly exceeds the limits of a permitted error for the experiment. [Begin p.195]

Determination of ΔF°.

The change in the free energy ΔF° merits the greatest attention among all thermodynamic functions which we utilize for characterizing ion-exchange reactions.

Change in free energy can be determined according to the following equation:

$$\Delta F^\circ = -RT \log K.$$

We are citing the numerical values of ΔF° found in this manner.

T	K	$\Delta F^\circ = -4.6 \log K$
288	0.150	1092
293	0.157	1084
303	0.177	1049
343	0.268	928
	Average	1075

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Data of the table show that the numerical values ΔF°, for the first three temperatures, can be considered as identical values. Consequently, at given temperature conditions we have a sufficient approximation to that dependence of ΔF° from T, at which $\frac{d \Delta F^\circ}{dT} \approx 0$, that is, ΔF°, practically, does not depend on T.

According to the equation of Gibbs-Helmholz

$$\Delta F^\circ - \Delta H = T \frac{d \Delta F^\circ}{dT} = T \Delta S^\circ.$$

From here it proceeds, that a change in entropy in the range of the given temperatures, or near zero or equal zero:

$$\Delta S^\circ \approx 0 \text{ (1)}$$

And that

$$\Delta F^\circ = \Delta H \approx 1075 \text{ calories,}$$ [Begin p.196].

that is,

$$Pli1/2\ Ca^{++} + NH_4^+ \longrightarrow PNH_4^+ + 1/2\ Ca^{++} - 1075 \text{ calories}$$

Thus, displacement of Ca^{++} ions by NH_4^+ ions is connected with a small negative thermal effect (endothermic reaction).

As much as $\Delta S^\circ \approx 0$, calculation of the equilibrium constant is simplified very considerably.

Actually, if one expresses the equilibrium constant through the change in enthropy and heat content, then in conformity with the well-known principles of thermodynamics

$$K = e^{\frac{\Delta S^\circ}{R} - \frac{\Delta H^\circ}{RT}}.$$

As $\Delta S^\circ \approx 0$, then one can write (after certain conversions and substitutions)

$$K = 10^{\frac{1075}{4.6T}}$$

---

(1) In another place [6] we showed, that at higher temperatures, than the considered ones (and at the reverse course of the reaction), $\Delta S^\circ = 8.49$.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Utilizing this simplest equation for the first variant of the experiment (which was conducted at T = 288°), we find

$$K = 0.155.$$

Experimentally for this temperature, as it was pointed out before, it was found

$$K_{exp} = 0.160.$$

The coincidence is sufficiently satisfactory

In conclusion let us examine the problem of reversibility of exchange reactions. We already pointed out, that in case of reversibility the numerical values of thermodynamic characteristics and the forward and the return motion of the reaction should be similar.

Earlier we have shown [5], that during the exchange of ions NH_4^+, Ca^{++} (the forward motion of the reaction) $\Delta F^\circ = -1039$. Here too, during the exchange of ions Ca^{++}, NH_4^+ (return motion of the reaction) $\Delta F^\circ = 1075$. In so far as both values are equal (one can disregard the small hysteresis), reaction of the exchange of potassium and ammonium ions in the soils can be regarded as a reversible reaction.

Conclusions

Reactions of the exchange of ions K^+, NH_4^+ and Ca^{++}, NH_4^+ on podzolic soils and on chernozem were studied.

It is pointed out, that during the exchange of ions of similar valency (K^+, NH_4^+) the numerical values of the equilibrium constant are close to one, and during the exchange of ions of different valency (Ca^{++}, NH_4^+) they fluctuate in the limits 0.15-0.26.

[Begin p.197]

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Experimental data are quite satisfactorily described by Nikol'skii's equations (for ions of similar and dissimilar valency).

The equilibrium constant does not depend on temperature during the exchange of ions K^+, NH_4^+; during the exchange of Ca^{++}, NH_4^+ ions it increases with the rise of temperature, but very slightly.

The numerical values ΔH°, ΔF°, ΔS° bear witness to reversibility, and, if one speaks simply, to the equal energy character of the reactions under investigation. These characteristics show also, that the adsorptive compounds PK^+, PCa^{++} thermodynamically are more stable than PNH_4^+.

LITERATURE

1. Nikol'skii, B. P., Methods for investigation of adsorption by soils from solutions. Sb. "Sovremennye metody issledovaniia fiziko-khimicheskikh svoistv pochv", 1948.
2. Uolton, G., Equilibrium during the exchange of ions. Sb. "Ionnyi obmen", 1951.
3. Materova, E. A., Exchange of cations on glauconite. "Uchenye zapiski Leningradskogo Universiteta", v. 7, 1945.
4. Poliakov, Iu. A., Influence of temperature on the exchange adsorption of potassium and ammonium ions in the soils. "Trudy Vsesoiuznogo Instituta udobrenii, agrotekhniki i agropochvovedeniia", 29, 1948.
5. Poliakov, Iu. A., Utilization of the radioisotope method for studying exchange adsorption of ions Ca^{++}, NH_4^+ in the soils. "Pochvovedenie", no. 7, 1955.
6. Boyd, G. E., Shubert, J., Adamson., "Journ. Amer. Chem. Soc.", 69, 1948.
7. Kussman, T., Kitcherner J. "Journ. Chem. Soc.", 1949.
8. Coleman, N. T., A thermochemical approach to the study of ion exchange. "Soil Science", 74, 1952.
9. Davis, L. E., Theories of base-exchange equilibriums. "Soil Science" 69, 1946.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

10. Poliakov, Iu. A., Thermodynamics of exchange adsorption of potassium and ammonium ions in the soil. "Kolloidnyi zhurnal", 9, no. 6, 1947.

11. Antipov-Karataev, I. N., Utilization of isotope method for research of phenomena of absorption by soils of electrolytes in connection with the amelioration of soils, 1955.

12. Graham, E. K., Testing Missouri soils. "Missouri Agr. Exp.".

13. Woodruff, C. H., The energies of replacement of calcium by potassium in soils. "Soil Science Society of Americal Proceedings", 19, 1955.

14. Edlefsen, N. E., Some thermodynamic aspects of the use of soil moisture by plants. "Amer. Geophys. Union Trans of 1941", part. III, 22.

15. Shardkov, V. S., Saltresistance of cotton. "Zapiski Tadzhikskogo sel'skokhozieistvennogo instituta", 1, 1948.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Krukov, P. A., and Komarova, N. A.

Issledovanie rastvorov pochv, ilov i gornykh porod.

[Studies of soil solutions, of silts and of rocks].

In Akademiia Nauk. Doklady VI Mezhdunarodnomu Kongressu Pochvovedov. 2d Komissia -- Khimiia pochv., p.151-169. Moskva, 1956. (Not in USDA)

(In Russian)

Among the natural waters the solutions, which saturate the surface layers of the earth crust: soils, subsoils, silts, and sedimentary rocks, occupy a special position. These "soil", "silt", "subsoil" and "rock"(1) solutions are distinguished from the free waters, in the form of drops by their state and their properties, which they acquire through the general influence of the solid phase.

According to V. I. Vernadskii, the basic part of the dry land's water is in the form of soil, silt, subsoil and rock solutions, which in their mass are surpassed only by ocean waters.

Studies of soil, silt and rock solutions proceeded in various ways, which, for the most part, were not connected among themselves in different branches of science: in chemistry of soils, limnology, oceanology, balneology, and a degree of their knowledge varies considerably. The greatest attention was given to the studies of soil solutions on account of their apparent practical value, and owing to the comparatively high general development of the chemistry of soils. The silt and the subsoil solutions

(1) This term has been adapted by us for a solution which has been isolated from rocks.

A 801

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

of the lake, sea, and ocean were less investigated. As to the rock solutions they began to be studied, from the point of view of their composition only in the last few years.

The soil solutions are, as it was pointed out by V. I. Vernadskii, "the basic substratum of life" on the earth and differ sharply in their biological role from the silt, and especially from the rock solutions. In fact the basic mass of living substance on dry land is directly dependent for its food and growth on the soil solutions. From them the land vegetation, and, through it, the animal world obtain not only the moisture but also the basic elements of nutrition. Exactly this circumstance gives to the study of soil solutions its scientific and practical importance. Of course, the life conditions of plants [Begin p.152] are determined by the general chemical affinity of the soil, by its physical properties, biological conditions in it, but among all these circumstances the leading importance belongs to soil solutions.

The soil solutions are genetically closely connected to other natural waters. The soil solutions "determine the chemical character of all surface waters of the biosphere" and, in particular, "the basic part of the saline composition of the river water "(V. I. Vernadskii [1]). Genetically closely connected with the soil solutions are the solutions which saturate the subsoils, and through them also the solutions which saturate the underlying mellow soils. The silt solutions are also genetically linked to soil solutions; very often, when the lake, river or sea subsoils become denuded, the silt solutions become transformed, through the metabolic activity of the plants, into soil solutions.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Title of figure. 1. An apparatus for squeezing out the solutions under pressure up to 1000kg/cm^2.
1. Cylinder; 2- base; 3- "gribok" [a mushroom-like part]; 4- rubber gasket; 5- sieve; 6- rubber gasket; 7- fibre gasket; 8- plunger; 9- container; 10- plate of a hydraulic press.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Title of figure 2. An apparatus for squeezing out solutions under pressures up to 10000kg/cm^2.
a- diagram of the apparatus: 1- ebonite gasket; 2- rubber gaskets; 3- sand; 4- piston;
b- outside view of the unit.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Studies of soil solutions, of their role in the process of soil formation and in the fertility of the soil, as well as their genetic connections with other natural solutions appear as actual problems not alone for soil science, but also for geochemistry and hydrochemistry. For a development of work in this field, a clarification of problems in methods and in theory of their researches can be of great importance. These methodical and theoretical questions, which are so closely inter-connected are common for studies of soil solutions as well as for the other above cited solutions, and the main part of our report is devoted to these questions.

The studies of soil and subsoil solutions fundamentally can be effected in two ways: without the separation from the solid phase and with their separation. The first manner can only be looked at as a prospecting, although even now a potentiometric evaluation is possible of the activities of individual ions- [Begin p.154] of hydrogen and of sodium, with the aid of suitable glass electrodes, as well as of the oxidation-reduction potential directly in the suspension. The most used at the present time is a method of analysis, which is based on a preliminary separation of solutions from the solid phase.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Title of figure 5. A tube for the replacement of soil solutions. 1- a plastic tube; 2- a coupling box; 3- a sieve; 4- a glass funnel; 5- a rubber gasket.

For the isolation of solutions from various subsoils and rocks the utilized methods and apparatus, developed for the separation of soil solutions appear to be quite suitable: methods of squeezing out and of replacement by liquids. The most known method is that of squeezing out of solutions, with the aid of which one can separate the solution not only from soils and silts, but also from most of the sedimentary rocks at their natural moisture content [2].

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Construction of an apparatus, which is utilized for separation of solutions by squeezing them out, depends substantially on the object's character - its moisture content and its ability to retain water. Customarily we use several types of apparatus for maximum pressures from 1000 to 10,000 kg/cm^2, which differ in the thickness of the cylinder walls, in which the squeezing out is conducted; in the sturdiness of the utilized steels and in certain details in construction. Two of these devices are shown in figures 1 and 2.

One must emphasize, that squeezing out of solutions at pressures up to 10,000 kg/cm^2 cannot be looked upon as an ordinary method for research, which is suitable for wide, practical utilization. It was used by us mainly for the studies of characteristics of the state of subsoil solutions, which basically reveal themselves in the range of ultra-high pressures. Yet, during separations of solutions from rocks one often needs to use pressures of 5-10 thousand kg/cm^2 [3]. A method for squeezing out at comparatively low pressures, of just several hundred kilograms per 1 cm^2, does not require an especially complex apparatus and can be regarded as quite practicable and sufficiently effective in many cases, especially when studying soils with a high natural moisture content and of the irrigated soils. [Begin p.155]

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Title of figure 4. An apparatus for replacement of solutions under pressures.
1- Cylinder for subsoil; 2- plungers;
3- base; 4- cylinder for alcohol;
5- plunger; 6- the mushroomlike part.

Another method, available for wide utilization, is the separation of solutions by their replacement with liquids (mainly with alcohol and dioxane). From the variants of this method, developed by us, the simplest one is the method described by N. A. Komarova [4]. The replacement is conducted from soils, which preliminarily have been mixed with sand, in glass or plastic tubes. The construction of tubes is shown in figure 3.

In another variant of the method, the replacement is conducted in a steel cylinder (fig. 4) in which the subsoil was preliminarily [Begin p.156] compressed by the plunger with the aid of a lever or a small hydraulic press.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Then a second cylinder is attached, alcohol is poured into it, and with the aid of the same press alcohol is squeezed through the subsoil with another plunger. This variant of the method is suitable for separating solutions from the samples of soils with an undisturbed gas process. In such a case thin-walled steel cylinders, which are inserted into a special soil sampler, serve as an apparatus for replacement. The cylinders with the obtained soil samples are closed tightly, covered up with wax, and, as soon as possible, the replacement of the solution from them is conducted as described above. Specimens of the soil air, which is in equilibrium with the soil solution, can also be obtained simultaneously with this.

Title of figure 5. A test tube for separation of solutions by centrifugation.
1- test tube of Plexiglas; 2- reservoir;
3- rubber ring; 4- a sieve; 5- a filter.

For separating solutions from moist subsoils (soils in a state which is close to a field moisture capacity, of silts, and even, sometimes, of sedimentary rocks) a very simple method of centrifugation can be utilized. The separation is conducted in special Plexiglass little glasses (fig. 5) in

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

a common type centrifuge, which provides a speed of 6,000 revolutions per minute. The solution is collected in a drip pan.

The cited methods supplement each other and together make it possible to separate the solutions from soil, silts, or sedimentary rocks in their natural state of moisture content, which is of great practical interest.

The methods for analysis of the separated solutions are also very important. These methods must also make it possible to evaluate the basic component parts in small volumes of 1-5 ml.

We have developed a system of semimicro and micromethods of analysis, which permits one to conduct an evaluation of six basic component parts in 1 ml of the solution at a total concentration of an order of 100 m-eqv/l. Most of these methods were already made public by us and we will limit ourselves to a short summary of them. Evaluation of pH [6] and of the activity of sodium ions is conducted with the aid of glass microelectrodes. [6,7]. The total salt content is preliminarily evaluated according to the rate of the electrical conductivity, which is first measured in a micro-vessel [8]. The specimen (or its part), after the evaluation in it of alkalinity, is passed through a column with H-cationite; in the filtrate are evaluated [Begin p.157] electrical conductivity and the concentration of Cl ions by potentiometric [9] or mercurimetric [10] titrating, and the concentration of SO_4 ions by titrating with an indicator of alizarine red C. The total salt content can be controlled according to the intensity of the electrical conductivity of the cationized solution [11]. Cations are washed off from the column by hydrochloric acid, Ca ++ and Mg ++ are evaluated by complex-forming type of titration [12]. The concentration of sodium ions is calculated from the pNa value, taking into consideration the ionic strength of the solution.

The procedure of separation and of analysis of subsoil solutions per-

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

tains to a considerable degree on the technique of their investigation. Together with this there exist purely methodological questions, which are closely linked to peculiarities of the physico-chemical state of soil, silt and subsoil solutions. To the number of such questions belongs a question on the dependence between the values of the pressure used during the squeezing out and the equilibrium residual moisture content. Studies of this dependence allow one not only to characterize the effectiveness of the method of squeezing out the solutions, but also to approach the quantitative evaluation of powers of reaction between the liquid and the solid phase of soils. Knowledge of this dependence permits one, in addition to evaluate the maximum pressure to which the studied rock was subjected under natural conditions. In connection with these problems the cited dependence must be studied under as wide as possible a range of pressures. We studied this dependence in the interval of pressures from several kilograms per 1 cm^2 up to 20,000 kg/cm^2 [13].

Squeezing out at pressures of 20,000 kg/cm^2 was conducted in a special apparatus with two cylinders fastened together (fig. 6).

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Title of figure 6. (on page 158). Apparatus for squeezing out at pressures up to 20,000 kg/cm^2; a- a diagram of the apparatus: 1- subsoil; 2- sand; 3 and 4- cylinders; 5- plungers; 6- sieves; b- details of the apparatus.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Clays of various mineralogical composition, soils and peats were taken as objects for investigations. Results of investigations are presented in figure 7 as a dependence of the equiponderant moisture content, which is expressed in percentage in a ratio to the dry matter from the logarithm of the applied pressure.

Title of figure 7. (on page 159). Dependence of moisture content on the pressure during squeezing out.
1- peat; 2- askangel'; 3- bentonite; 4- kaolin;
5- chernozem; 6- sierozem.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

For all the objects, with the exception of peat, the moisture content is continuously decreasing with the increase of the pressure, whereupon on certain sections the dependence proves to be linear. For objects of mineral origin the moisture content, remaining at 20,000 kg/cm^2 pressure, is in the limits of 12.2% for bentonite and up to 3.6% for kaolin. Only for peat there appears to be moisture which cannot be pressed out altogether.

It is essential to compare the obtained data with a presently widespread idea about the moisture film, which is bound to the value of "maximum molecular moisture capacity", as of a special category of water, which differs sharply from the free moisture. Our data for inorganic [Begin p.169] gels does not show on the curves of squeezing out any special points which would correspond to the value of maximum molecular moisture capacity, which thus appears to be a conventional value.

During examinations of soil, silt and subsoil solutions the principle and methodic importance is given to the question regarding the uniformity of the composition of fractions of the solution, which are successively extracted during the squeezing out or [Begin p.160] during the replacement. The question about the homogeneity of the compositions of the extracted and the non-extracted solutions is very closely linked to it.

It is essential to discern two kinds of reasons for a possible heterogeneity in the successively extracted fractions of the solutions.

To the first group will belong the factors, which respond to the very nature of these solutions in situ and which lead to their natural heterogeneity - to the change in concentrations of the solutions as they are further removed from the surface of the solid phase. This natural heterogeneity of solutions can complicate the interpretation of their analysis, but it corresponds to their nature and, besides, has an importance, which is con-

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

nected with the natural processes of squeezing out the solutions from the subsoils.

The second group of factors can have a relation to the very process of extraction of solutions and leads to the heterogeneity between the composition of the extracted solution and of that one which remains under natural conditions. The natural heterogeneity of solutions depends on the characteristics of the surface of the solid phase; in the first place - on its hydrophilic nature, as well as on the concentration of the electrolytes. Influence of the hydrophilic nature can be illustrated graphically (figure 8) where changes are shown in the composition of successively squeezed out fractions of the solution of three clays: bentonite, askangel' and Kaolin. These clays were preliminarily purified by electrodialysis, then dried, and to them were added water and sodium chloride in such amounts so that the average concentration would be about mono-molal. In the first fractions of the extracted solution the concentration of chloride ions was considerably larger, than the calculated one for a uniform composition of the solution, and the greatest excess in the concentration is noted for askangel' and the smallest for kaolin.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Title of figure 8. (on page 161). Changes in the concentration of Cl ions at the time of squeezing out the clays: 1- Askangel', mean concentration "(S.K.)" [average concentration] of NaCl- 0.93 n.; 2- Kaolin, S.K. of NaCl- 0.898 n.; 3- bentonite, S.K. of NaCl- 0.856 n.; 4- bentonite, S.K. of NaCl- 0.091n; 5- bentonite, S.K. of NaCl- 0.009n.

The words in the figure 8 are: at the left - Cl' m-eqv/l; within the graph: 594 kg/cm^2 1420 kg/cm^2. 5850 kg/cm^2; under the graphs % of water in ratio to the dry substance.

For the given series of experiments the concentration of chloride ions in the successively extracted fractions remains stable in the initial region, and then diminishes sharply. The moisture content and the pressure which correspond to the beginning of the reduction of the concentration, are substantially different for these three objects. The heterogeneity of the

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

solution begins to develop at a greater moisture content, the greater is the hydrophilic nature. For askangel' the diminution of concentration begins already at 70% of moisture content, calculated in ratio to dry substance and at a pressure of 600 kg/cm^2, for bentonite - at 50% of moisture content and a pressure of 1300 kg/cm^2, and for kaolin - at about 10% of the moisture content and a pressure of 3800 kg/cm^2. At the same time for all these objects at the given concentrations of sodium chloride there appears a presence of a certain part of the solution which has a constant concentration.

The degree of heterogeneity of the successively extracted fractions of the solution largely depends, besides this, on the concentration [Begin p.161] of the electrolyte. On that same figure data are compared pertaining to squeezing out from bentonite of sodium chloride solutions at average concentrations - approximately from the molal to centi-molal. The lower is the concentration of the electrolyte the earlier it begins to change during the squeezing out. At an average concentration of about 0.01 m-eqv/l the extracted solution shows a decrease in the concentration already from the very first fractions.

It is essential to compare the obtained data with the theory about "the undissolved volume" as a form of a fixed water, which is sharply delimited from the free water by an absence of dissolved substances. Our experiments show that although the concentration of electrolytes in the dispersed systems, which interest us, diminishes towards the surface of the solid phase, yet we did not find any "undissolved volume" as such. [Begin p.162].

When examining dispersion of various ions in successive fractions of the solution, which was squeezed out from montmorillonite clays with a natural content of electrolytes, more complex phenomena are found.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Title of figure 9. Change in the composition of the solution, which is squeezed out from bentonite.
Words on the left of the graph: m-eqv/l.

For bentonite (fig. 9) here too the general salt content at first is kept constant, and after a while it falls, but the conduct of individual ions is not identical.

Concentration of Cl ions decreases by 2.3 times, and of SO_4^{n} ions by 3.2 times. Concentration of magnesium ions rises in the last fractions. For askangel', in which the general concentration of electrolytes is small, the fall of concentration is noted already in the first fractions.

Of course, for objects, which do not have such a high hydrophilic nature, as montmorillonite clays have, and also at a high concentration of electrolytes, the heterogeneity of the solution can practically be undiscovered.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Decrease of concentration in successive fractions is noted in many cases not only at the squeezing out of solutions, but also at the replacement of them by alcohol or dioxane, and, thus, is not connected to the peculiarities of method of their isolation. In fig. 10. is presented a curve of the change of the electrical conductivity of NaCl solution, which was extracted from silica gel and which showed the same properties as during squeezing out. In tables 1 and 2 results are given of experiments, which were conducted with soils of different moisture content. [Begin p. 163].

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 1.

Content of chloride and of dry residue in successive fractions of soil solution. Soil: a chloride-sulfate weakly leached solonets, horizon B_1

Moisture content in % from the weight of soil	Moisture content in % from full moisture capacity	Volume of each extracted fraction of solution ml	Evaluated	In successive fractions of soil solution were found, mg/ml								
				1	2	3	4	5	6	7	8	9
26.1	60	2	Chloride	7.81	7.81	7.46	7.46	7.10	6.75	5.33	4.20*	3.57*
			Dry residue	15.05	15.63	15.51	14.11	13.82	13.36	10.96	9.09*	6.81*
21.8	50	2	Chloride	10.29	10.29	9.94	9.23	8.52	6.96	5.68*	3.55*	-
			Dry residue	25.16	23.91	22.26	21.60	19.33	14.15	9.31*	8.33*	-
13.1	30	1	Chloride	21.65	20.59	19.88	18.46	14.91	7.32*	-	-	-
			Dry residue	45.94	43.39	39.12	33.66	28.17	16.07*	-	-	-
8.6	20	1	Chloride	40.47	39.05	31.24	21.30	-	-	-	-	-

* The marked fractions of the solution contained traces of alcohol.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Title of figure 10. Change in electrical conductivity of NaCl solution, isolated from silica gel by replacement with alcohol.

Words in fig. 10: Homogeneous solution (left to right)
Heterogeneous solution
Mixture of the solution with the displacer.
70 ml.

[Begin p.164]

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Composition of successive fractions in a soil solution Table 2.

Soil	Moisture content of soil in the experiment, %		Volume of each extracted fraction of the solution, ml	Evaluated	In successive fraction of the soil solution werefound, mg/ml													
	from full moisture capacity	from weight of the soil			1	2	3	4	5	6	7	8	9	10	11	12	13	14
Average-columnar sulfate-chloride solonetz, horizon B_1	60	27.4	2.5	Chloride	1117	1:22	1:22	1:22	1.22	1.22	1:22	1:21	1:21	1:19	-	-	-	-
				HCO'_3	00631	0:61	0:64	0:64	0:64	0:64	0:64	0:64	0:64	0:64	-	-	-	-
				Sodium	0.82	0.95	0.82	0.87	0.91	0.87	0.93	0.91	0.96	0.90	0.85	0.85	0.87	0.87
	60	27.4	2.0	Dry residue	3.18	3117	3.23	3.04	3.08	3.14	3.25	3.18	3.17	3.10	3.15	3.11	3.12	3105
Suberous-columnar sulfate-chloride solonetz, Horizon B_1	40	22.1	2.5	Chloride	10:15	10:08	10:08	9,94	9:87	9:80	9:61	9:09	9:09	8:95	8:66	8:66	7:81	6.39
				Sodium	2:91	2:94	2:93	2:97	2:89	2:92	2:97	2:88	2:86	2:85	2.73	2:64	2:51	2.19
				Calcium	1:21	1:25	1:27	1:23	1:21	1:21	1:18	1:21	1:19	1:15	1:11	1:16	1:06	0.78
				Magnesium	0.97	1.00	0.98	1.02	0.97	0.97	0.95	0.93	0.97	0.92	0.95	0.95	0.77	-
				Dry residue	18.77	19.44	18.62	18.25	18.28	18.21	18.23	16.88	17.88	15.73	15.93	15.54	13.52	11.21

Footnote. Fraction 14 in the 7th experiment contained an admixture of alcohol.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The degree of heterogeneity is the greater, the smaller is the moisture content of the soil.

No heterogeneous part in the solutions was found when replacements of solutions were made from salanized soils. [14].

Besides this, one should consider the possibility of influence of other phenomena, which are connected with the process of the extraction of solutions, on the heterogeneity of the composition of successive fractions.

First of all we expected an influence of the membrane balance-irregular dispersion of electrolytes between the separated and the residual solution, which is conditioned by the charge of particles of the solid phase.

The measurements of membrane potentials, which we conducted earlier, and which arise during the settling of suspensions, have shown, that this effect for silica gel, for which it is generally very definitely expressed, can be of substantial importance only at a concentration of the electrolyte of not less than 0.1 g-eqv/l.

Of late, thanks to the utilization of glass electrodes with a sodium function, we obtained a possibility for a direct measuring of the activities of sodium ions, both in moist objects, as well as in solutions separated from them. [Begin p.166]

In table 3 are combined the pNa values, which were measured both in pastes and in centrifugates, or in solutions squeezed out from them for a series of objects: soils, silts and clays, while the latter ones were taken both with a natural content of electrolytes, so also in a Na-form in solutions of sodium chloride of different concentrations. It is only in askangel', either natural or in a 0.01 n. solution of sodium chloride, that one notes a substantial difference between pNa values in the paste and in the extracted solution. Activity of sodium ions in pastes is here greater than in solutions:

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

pNa values differ by 0.2-0.5 of a unit. Thus, sodium ions qualitatively conform to the same rules which were established for hydrogen ions when the, so-called, suspension effect was investigated. For most of the examined objects pNa values in pastes and in solutions have the same significance. It appears then, that the influence of the membrane potential can cause a difference between the composition of the extracted solution and the solution in situ only in such objects, exceptional in their hydrophilic nature, as the askangel'.

Phenomena of natural heterogeneity and of membrane potential were mainly illustrated by our experiments [Begin p.166] with montmorillonite clays, as the cited phenomena develop more sharply for these objects, which are often used for modeling. Naturally, the investigated phenomena deserve further study, yet they mostly do not play any important role during practical studies of soil, silt and rock solutions. Usually for the simplification of an interpretation of analysis of extracted solutions it is sufficient to collect homogeneous fractions controlling their composition in electrical conductivity, or analytically. When utilizing only small pressures for the extraction of solutions, the composition of the squeezed out solutions usually is homogeneous.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 3.

Comparison of pNa values in pastes and solutions

Object	pNa in paste	pNa in solution
Na-kaolin in 0.01 n. NaCl	1.91	1.91
0.05	1.35	1.35
0.10	1.07	1.07
0.50	0.37	0.37
Na-askangel' in 0.01 n. NaCl	1.65	1.87
0.05	1.29	1.29
0.10	1.07	1.07
0.50	0.49	0.49
Solonetz, average-columnar 0-12 cm	2.47	2.47
12-26 "	1.11	1.11
26-32 "	0.99	0.99
210-240 "	0.94	0.94
Silt karachailagskiia	0.94	0.94
Silt tikhookeanskiia [from Pacific Ocean]	0.31	0.31
Bentonite oglanlinskii	1.16	1.16
Askangel'	1.18	1.68

Before concluding we would like to cite two instances of analyzing soil and subsoil solutions which point to the advantage of a direct method for their investigation over other indirect methods. Such indirect methods are, as it is known: 1) water extraction method, and 2) study of bore waters.

The first example, which is taken from a work by N. D. Avakian [15], pertains to the exposed soils in the region of the lake Sevan. On figure 11 are shown cross sections for one of the plans which was compiled according to

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

data for water extractions and data for soil [Begin p.167] solutions. It is well known, that these data usually differ substantially, since as a rule, the water extractions, in consequence of the additional dissolving action, have a larger content of salts, when calculated per 100 g of soil, than the soil solutions. But here we have an opposite picture. The reason for this is, that the given subsoils are very rich in an organic substance - sapropel and the soil solution which saturates it lacks time to pass over into the water extraction, but, certainly, can be squeezed out comparatively easily.

Title of figure 11. Comparison of water extractions and of soil solutions from the denuded sapropel subsoil in the Sevan bay:
a- according to the water extraction data;
b- according to soil solution data.
Words in a- cm; m-eqv per 100 g
" " b- cm.

The second example does not refer to the soils, but to the rocks from the region where Stalingrad State electric power plant was constructed. On figure 12 data are compared of the composition of rock solutions and of bore water. The rock solutions permit one to characterize the underground waters,

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

which are saturating the rocks continuously along the full extent of the bore with any desired degree of detail [Begin p.169] and without any dependence on the fact if the given horizon is aquiferous or water-resistant. In the cited case the bore water was obtained from the water-bearing horizon. This instance, in an exaggerated manner, permits one to illustrate an idea, which is not yet evaluated in soil science: a need to supplement data for underground waters with data from analysis of soil solutions.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Title of figure 12 (on page 168). Composition of rock solutions and of bore water from the region of Stalingrad State power plant. Words in the figure: rock solutions; m-eqv/l. Water mg-eqv/l.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Thus, both these examples show that neither the examinations of water extractions, nor the examinations of waters from water-bearing horizons give any sufficiently reliable and full characteristics of the state of the solutions, which are saturating the soils and subsoils. Such a characteristic can be obtained only from a direct study of soil and subsoil solutions.

LITERATURE

1. Vernadskii, V. I., History of natural waters, part 1. vol. 1. 1933.
2. Kriukov, P. A., Methods for squeezing out soil solutions. In "Sovremennye metody issledovaniia fiziko - khimicheskykh swoistv pochv"; 4, v.2 1947
3. Buneev, A. N., Kriukov P. A., and Rengarten E. V., An experiment in squeezing out of solutions from sedimentary rocks. "Doklady AN SSSR", 57, no.7 1947.
4. Komarova, N. A., Displacement of soil solutions by a method of replacement with liquids and utilization of this method in soil analysis. "Trudy Pochvennogo Instituta AN SSSR", 1956.
5. Kriukov, P. A., Measuring pH value with a glass electrode. In "Sovremennye metody khimicheskogo analiza prirodnoi vody" Izd-vo AN SSSR, 1955
6. Shul'ts, M. M., Analysis of sodium function of glass electrodes. "Uchenye zapiski Leningradskogo universiteta", no. 169, seriia khimicheskaia, v. 18, 1953
7. Kriukov, P. A., Shul'ts, M. M., and Goremykin V. E., About the possibility of utilization of glass electrodes with a sodium function during an analyzis of water. "Gidrokhimicheskie materialy", 24, 1955.
8. Kriukov, P. A., Methods for measuring electrical conductivity. "Gidrokhimicheskie materialy",22, 1954.
9. Kriukov, P. A., Potentiometric evaluation of chloride ions. In "Sovremennye metody khimicheskogo analyza prirodnoi vody". Izd-vo AN SSSR, 1955.
10. Kriukov, P. A., and Nomikos, L. I., Mercurimetric method of evaluating the concentration of chloride ions. In the same publication as 9
11. Kriukov, P. A., and Protsenko, G. P., Utilization of ionites for the evaluation of the general mineralization of water. In the same publication as 9.
12. Kriukov, P. A., and Tsyba, N. P., Trilonometric evaluation of the sums of calcium and magnesium. In the same publication, as 9.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8)1

13. Kriukov, P. A., and Komarova, N. A., About squeezing out the water from clay at ultra-high pressures. "Doklady AN SSSR", 99, no. 4, 1954.

14. Komarova, N. A., The problem of studying soil solutions. "Pochvovedenie", no. 10, 1939.

15. Avakian, N. O., A comparative study of soil solutions and of water extractions from denuded soils of Lake Sevan. "Izvestiia AN Armenian SSR", 7, no. 7, 1954.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

(In full)
vg/M

Aleshine, S. N.

Sorbtsionnoe sostoianie ionov vodoroda i aliuminia v pochve.

[Sorptional state of hydrogen and of aluminum ions in the soil].

In Akademiia Nauk. Doklady VI Mezhdunarodnomu Kongressu Pochvovedov. 2d Komissia - Khimiia Pochv. p.127-137. Moskva, 1956. (Not in USDA)

(In Russian)

As it is known, in colloidal chemistry those ions are classified as exchange ions, which compose the outer part of the electrical double layer. These ions are able to enter into exchange with all other ions of the same charge in the solution in so far as the nature of the forces of interaction of these ions with the inner lining of the electrical double layer of the colloidal particle is electrostatic. As to the inner lining of this layer it consists of potential - determinant ions, incapable of exchange, because these ions by forming a low-ionized contact with the component parts of the micelle nucleus, are its part.

In an absorptive complex of the soil, which is not saturated with the bases in an exchangeable state, Gedroits assumed the presence of hydrogen ions, and Daikukhara - of aluminum ions, besides the alkali earth and the alkali cations. Introduction of a hydrogen ion into the absorptive soil complex imparts to the soil some acid properties. The active concentration of hydrogen ions on the one hand, and the exchange acidity, on the other, show the extent of acidity of such soils. The exchange acidity is considered by K. K. Gedroits as a result of exchange of hydrogen ions of the soil upon a cation of a reacting salt. As to the aluminum, which appears during the

A
802

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

process of evaluation of this acidity, according to Gedroits' assumption, its appearance in the solution is dependent on the solvent action on the aluminum hydroxide of the acid which is formed as a result of the exchange of a salt cation upon the exchange hydrogen ion of the soil [5].

Daikukhara and Kappen [18,6] explain the cause of the appearance of soil acidity as the result of direct exchange of aluminum ions upon cations of the acting salt and the following hydrolysis of the formed salt of aluminum. Subsequently, under the influence of convincing evidence which was presented by the works of Gedroits, Wiegner, and Mattson [5,26,1] Kappen renounced [Begin p.128] Daikukhara's point of view. Of late this conception is being revived again in the works of V. A. Chernov [13].

A substantial step forward was made by the establishment of a possibility of a separate evaluation ofthe acidity of the soil's salt solution in a form of: 1) acidity, conditioned by the hydrolysis of aluminum salts, and 2) of acidity, conditioned by the presence of free hydrogen ions in the solution. Such a division was brought about owing to the ability of aluminum ions to form a complex anion with oxalate anions [2] and with fluorine ions [12]. It was ascertained, by these methods, that the acidity of the mineral part of the soil is conditioned only by hydrolysis of aluminum, which passed into the saline soil extract. Concerning the organic part of the soil, one can assume that its acid properties are conditioned by a presence therein of organic acidoids, which can form low-ionized compounds with alkaline and alkali-earth cations (with K^{+} and Ca^{++} in particular).

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 1.

Exchange acidity of certain peats and of krasnozem (in m-eqv per 100g of soil)

Adsorbent	pH aqueous	Saline solution					
		1 n. HCl			1 n. $CaCl_2$		
		pH	Without NaF	With NaF	pH	Without NaF	With NaF
Peat-Sphagnum, upper (Malokosinskii)	3.45	2.30	11.20	11.03	2.10	13.80	14.32
Peat-Sphagnum, intermediate (Shit'kovskii)	4.20	2.70	8.28	6.86	2.40	9.64	8.62
Peat, sedge, lowland (Solnechnogorskii)	3.25	2.05	21.6	-	1.80	26.2	28.6
Peat, wood, lowland, (Solnechnogorskii)	-	2.05	26.9	24.1	1.70	35.0	34.6
Krasnozem from Chakva (West. Georgia)	4.78	4.10	11.3	none			
The same soil, but treated with concentrated HCl	4.25	3.30	6.36	"			

Footnotes:

1. Ration of the weight of the adsorbent to the volume of the solution for peat equals 1:20; for Krasnozem-1:2.5.
2. First value of pH: for water-5.35; for solutions HCl-6.80 and $CaCl_2$-6.40.

Data cited in table 1, show that samples of peat, which were artificially saturated with hydrogen ions, acquired an exchange acidity, which was conditioned by exchange-absorbed hydrogen ions of the organic acidoids of peat, in so far as this acidity does not disappear after an addition of sodium fluoride to the saline solution. The acidity in Krasnozem samples disappears after an addition of sodium fluoride, which testifies about its dependence on aluminum ions, which appeared in the saline solution.

The following experiment was conducted in order to explain the cause of appearance of aluminum in the solution: 20 g of Krasnozem were put in a flask, which was sealed with a reflux condenser, was heated, in the course of 3 hours, in a water bath in a solution of concentrated (d= 1.19) hydrochloric acid. After cooling of the solution, the acid was washed off until there was no reaction to Cl-ion, it was dried, pulverized and weighed; of the 20 g - 8.2 g dissolved, 11.8 g remained. Acidity was evaluated in the remainder and its

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

numerical values are cited in table 1. In this case, as well as in a natural sample, the acidity is dependent on the appearance of aluminum in the solution. It is not possible to explain this appearance by a dissolving action of the exchangeable hydrogen on aluminum hydroxide (according to Gedroits) because the concentrated hydrochloric acid appears to be a sufficiently strong reagent for its dissolution and expulsion. There is also no reasonto admit the presence of exchangeable aluminum, as long as only the hydrogen ions could have been adsorbed from the stable solution of the acid, which reacted with the soil. There is but one possibility to explain the cause of the appearance of aluminum in the saline solution as a result of a breakdown of acid aluminosilicate minerals, which enter into the composition of matrixes (lattices)!

We have expressed this hypothesis yet in 1935, and grounded ourselves on the premise that the intrusion of hydrogen ions into the lattice of the clay minerals, of the type of montmorillonite, beidellite, as well as of hydromicas, drives them into an unstable state, which is analogous to the state of weak acids, which are formed during displacement of cations in the salts of these acids by hydrogen ions. But the weak acids, as they are known, are characterized by a negligible degree of dissociation, that is, by a great energy in the bond of the hydrogen ion, and thus, applying these ideas to the soil absorbing complex, one should admit that the absorption of the hydrogen ion is proceeding non-exchangeably under conditions of efflorescence and of soil formation. The non-exchange absorption of ions proceeds according to a type of adsorption of potential - determinant ions, which differs, qualitatively and quantitatively from the exbhange adsorption. The first is calculated according to an equation of Lange-Ferveiaia [21], the second by numerous equations of various authors [Begin p.150] which base themselves on the application of the law of mass action tothe processes of interaction

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

of solutions of cations of salts with the soil.

Table 2.

Adsorption of hydrogen ions from the solution in mixture with calcium ions. (according to data of V. A. Chernov and his co-workers, [14])

In solution with Ca^{++}=0.1008 n. was found H^{+}, m-eqv/l	log $[H^{+}]$	H^{+} absorbed, m-eqv		Ca^{++} absorbed, m-eqv	A constant of the exchange adsorption, according to Nikol'skii [9]
		found	calculated		
Krasnozem					
2.6	0.41	1.19	1.26	67.9	0.55
11.5	1.06	2.61	2.53	63.8	0.28
21.9	1.34	2.61	2.79	64.5	0.15
33.2	1.52	3.08	3.09	63.8	0.12
39.9	1.60	3.15	3.22	63.8	0.10
45.0	1.65	3.88	3.31	62.9	0.11
Askangel' [Montmorillonite clay					
6.95	0.84	1.90	1.93	58.8	0.36
14.5	1.16	2.61	2.73	63.4	0.25
21.4	1.33	3.30	3.15	56.9	0.21
28.2	1.45	3.69	3.45	55.3	0.17
36.5	1.55	3.70	3.69	54.7	0.14
43.7	1.64	3.88	3.92	51.8	0.12

In the last column of table 2 are cited the numerical values of the "constant" of the adsorption, which was calculated according to the equation of B. P. Nikol'skii [9], deduced on the basis of the law of mass action. As it is seen, there is no constant obtained, and, consequently, there is no possibility to talk about applying the law of mass action oto the adsorption of hydrogen ions by clay minerals. Krishnamoorthy and Overstreet [20] also come to similar conclusions; they showed that other equations of this type are not suitable to equilibrium systems in which hydrogen ions take part.

The amounts of adsorbed hydrogenions, which were found experimentally, are cited in the 3rd column of table 2, and in the fourth column - the same amounts, which were calculated by the application [Begin p.151] of the equation of Lange-Ferveia:

$$A = K_1 / K_2 \cdot \log C.$$

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

The diagrammatical view of the curve is shown in Figure 1 and the numerical values of the constants for the analyzed adsorbents are also cited there.

As the figures show, the calculated amounts of milliequivalents of adsorbed hydrogen ions agree quite satisfactorily with the experimental data, and this again testifies to the non-exchange absorption of hydrogen ions.

Words in the diagram:

A = m-eqv per 100 g

_____ x _____ Krasnozem

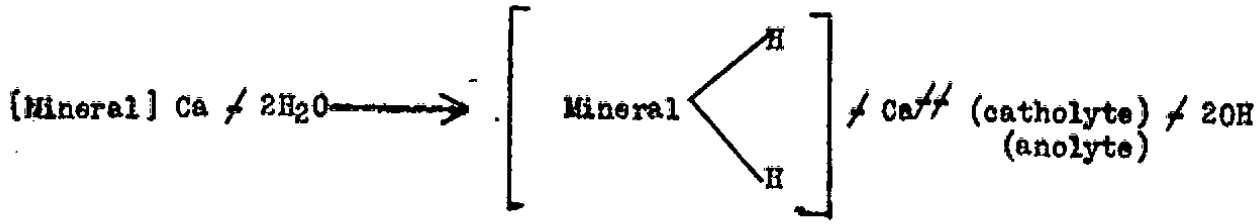
_____ . _____ askangel'

Title of figure 1. Direct adsorptions of potential-determinant hydrogen ions. Constants of adsorption: for Krasnozem K_2 = 0.67 and K_2 = 1.66; for askangel' K_1 = 0.15 and K_2 = 2.48

One can assume that under laboratory conditions an electrodialysis will to a certain degree be the most suitable method for saturation of the soil with hydrogen ions; with this method the action of the electric current results essentially in the expulsion of cations which enter the water owing to hydrolysis of the electrodialyzed mineral, approximately according to the following scheme:

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8



As a result of this, a sample of montmorillonite clay (askangel') was subjected to careful electrodialysis until full removal [Begin p.132] of cations. After the end of the electrodialysis the clay was dried and analyzed for exchange acidity by processing with successive portions of a normal solution of KCl until the full removal of acidity. After that the clay was washed off with distilled water for elimination of KCl and again subjected to electrodialysis for a full extraction of the absorbed calcium. Once again, ffor the second time, dried and analyzed for exchange acidity. We are citing the obtained values of the acidity and the amount of exhhangeable cations and of calcium, which were evaluated by titrating of the catholyte.

1. Electrodialysis of the native askangel': the number of cations in the catholyte per 100 g of clay - 62.2 m-eqv; the exchange acidity of the electrodialyzed clay - 81.6 m-eqv.

2. Electrodialysis of the askangel', saturated with calcium; number of cations in the catholyte per 100 g of clay - 17.4 m-eqv; the exchange acidity of the re-electrodialyzed clay is 48.6 m-eqv.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Title of figure 2. Thermograms.
1. Askangel'; 2. Electrodialyzed askangel'.

It is interesting to note, that at every addition of sodium oxalate to the salt solution, by which the clay was treated, the acidity disappeared. This would indicate that the acidity is conditioned only by aluminum which appeared in the solution, and which could not appear in any other way than as a result of a breakdown of a certain part of the acid surface of the askangel'. In order to discover the supposed changes in the clay during an electrodialysis a thermographic analysis was made. Curves of heating in figure 2 are given before and after electrodialysis. It turns out to be that on the thermogram of the electrodialyzed clay the endothermic peaks appeared the most sharp at temperatures of 186° (evaporation of adsorbed water) and at 875°, a peak which is dependent on the breakdown of the surface hydroxyl layer of

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8 at the in-

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

trusion of hydrogen ions into three-layer minerals there occurs a formation of hydroxyl groups at the expense of the irreversible addition of hydrogen ions to oxygens of the tetrahedral aluminum and silicon. The formed compounds, as it was shown by V. A. Kargin [7, 16] and by his co-workers [Begin p.133] on electrodialyzed alumosilicate gels, hydrolytically adsorb the alkalis from the solution of a neutral salt with a simultaneous acidification of the solution. There is a reason to consider that the acidification of the saline solution, when determining the exchange acidity of the mineral part of the soil, occurs as a result of the irreversible adsorption of the hydrogen ion and a formation of a hydroxyl encircling of aluminum ions. And as the Al-ion, with a hydroxyl around it, should have an octahedral structure then there should proceed a corresponding rebuilding with a partial destruction of the surface layer. With the disappearance of the aluminum tetrahedrons in the surface layer there remain unbalanced valences of silicon tetrahedrons, which adsorb hydroxyl ions from the water in the capacity of charged ions with a simultaneous adsorption of cations into the exchange layer. Thus, the salt of a strong acid or of a strong base in the presence of an acid surface of aluminosilicate minerals is capable to hydrolyze.

In conformity with the mechanism of such an action one can presume that in proportion to the destruction of aluminum tetrahedrons on the surface the release of aluminum will decrease, and free hydrogen ions can appear in the solution; this is what was stated in the works of Mukherjee and of his co-workers [23].

It was shown by the works of H. Britton [8], of B. P. Nikol'skii [10], and of others [1,8,24] that at those values of pH, which are usually characteristic for the soil, aluminum cannot exist in ionic form: it produces hydroxides in colloidal form of various degrees of dispersion. Proceeding from

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

this, one cannot allow a possibility of finding it in an exchangeable state. Askanite was saturated with a solution of aluminum chloride up to a full expulsion of the exchangeable alkaline-earth cations. This sample was then washed clean from free aluminum (until the disappearance of a reaction to Cl^n), was dried and then analyzed thermographically and electronomicroscopically. In figure 3, an askanite thermogram is shown; askanite has been treated with a solution of aluminum chloride.

The thermographic curve shows an appearance of a new sharp endothermic peak at a temperature of 717° and a sharpening of the peak at 885°, which is linked to the absorption of the hydrogen ion, as it was shown on the curve of the electrodialyzed askangel. Thus, when saturating the soil minerals with aluminum ions from a solution of aluminum chloride a process occurs, whose approximate scheme will be: $Al^{3+} + 3H_2O \longrightarrow Al(OH)_3$ (is released in the form of a hydroxide) $+ 3H^+$; the last one is irreversibly absorbed by the surface [Begin p.134] of aluminosilicate minerals of a type of montmorillonite, beidellite, or hydromicas. The long rods, which are forming in the askanite (fig. 4), that was saturated with aluminum, belong to crystalline formations, similar to those which were observed by some other anthors [16].

Minerals, which were saturated with ions of manganese [19] and ions of iron [17] have also shown an appearance in them of crystalline formations of hydroxides of these elements.

Title of figure 3. Thermogram of the askanite, which was treated with a solution of aluminum chloride. The last word in the diagram is: minutes.

Title of figure 4. (on the opposite page) Electron microscopic photographs: a-askanite; b-askanite which was treated with a solution of aluminum chloride (enlarged 40,000 times)

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Thus, summarizing all that was set forth above, one can say that a hydrogen ion, which is so wide spread in the earth's crust (more than 17% in the number of atoms), being a proton and, thus, being the most mobile among all the elements, attaches itself very easily as to the organic, so also to the inorganic compounds. Academician D. N. Prianishnikov [11] and his students have found out the great role of concentration of hydrogen ions in the feeding of plants.

An indespensable condition for existence of an organism is a constant metabolism with the outside medium. Only the chlorophyll-carrying organisms have the ability to synthesize organic substances of a complex composition from carbon dioxide and water. [Begin p.136] In order to obtain elements of mineral nutrition the plant must draw them from the soil, either directly from the solid phase or from the soil solution. But to obtain from a mineral (or from a solution) say a K-ion, an organism must in exchange return a positively charged ion into the surrounding medium. Only a hydrogen ion can be such an ion. During the process of growth only this ion can arise in a plant independently of other ion exchange reactions. Its formation in a living organism depends on acidification of the organic substance, which was previously synthesized by chlorophyll-carrying plants from non-ionized substances, water and carbon dioxide, which enter the plant without exchange. The organic sub substance which is being formed in the plant during subsequent processes is oxidized up to the carboxylic acid, which, by dissociating, can return hydrogen ions into the outer medium. This is then what determines the active role of living organisms in the processes of soil formation; and, according to the teachings of V. R. Williams, this distinguishes the process of soil formation from the process of efflorescence.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Literature

1. Aleshin, S. N., Role of hydrogen ion in the processes of efflorescence and of soil formation. "Izvestiia Sel'skokhoziaistvennoi Akademii im. Timiriazeva", no. 1. 1952.

2. Aleshin, S. N., and Goletiani, G. I., About the nature of exchange acidity of the mineral part of the soils. "Khimizatsiia sotsialisticheskogo zemledelia", no. 12, 1935.

3. Britton, Kh. T. S., Hydrogen ions, 1956.

4. Williams V. R., Soil science, 1946.

5. Gedroits K. K., Selected works, vl 1, 1955.

6. Kappen, G., Soil acidity. 1934.

7. Kargin, V. A., Adsorption of electrolytes on silicic acid, sesquioxides and of their composite gels. "Uspekhi Khimii", 8, vyp. 7, 1939.

8. Kertman, L., The course of a qualitative analysis, 1938.

9. Nikol'skii B. P., Methods for studies of adsorption by the soils from solutions. "Sovremennye metody issledovaniia fiziko-khimicheskikh svoistv pochv", vyp. 8, Izd-vo AN SSSR, 1948.

10. Nikol'skii, B. P., and Paramovnova, V. A., Potential-metric titration of aluminum salts and the colloidal properties of aluminum hydroxide. "Zhurnal fizicheskoi khimii", 2, vyp. 5, 1931.

11. Prianishnikov, D. N., Selected works. 1952, 1953.

12. Sokolov, A. V., Detection of active aluminum in the soil. "Khimizatsiia sotsialisticheskogo zemledelia", no. 7, 1939.

13. Chernov, V. A., About the nature of soil acidity, 1947.

14. Chernov, V. A., Beliaeva, N. I., and Kislitsyna, L. P., Comparision of adsorption energies of hydrogen ions, trivalent aluminum, calcium and ammonium in krasnozem and chernozem. "Pochvovedenie", no. 6, 1952.

15. Shekhter, A. B., and others. "Doklady AN SSSR. 89, no. 1, 1953. [Begin p.137]

16. Shishniashvili, M. E., and Kargin, B. A., Electro-chemical properties of highly purified ferroalumosilicic gels and ashes. "Colloidnyi zhurnal", 8, no. 1-2, 1946.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

17. Beutelspacher, H., Weshselwirkung zwischen anorganischen und organischhen Kolloiden des Bodens. "Ztschr. Pfl. Dung Bodenk.", 699, H. 1-3, 1955.

18. Daikuhara. "Bull. of Imper. Ont. Agr. Station", 11, no. 1, 1914.

19. Hemstock, A., and Low, P., Mechanisms responsible for retention of manganese in the colloidal fraction. "Soil Science", 76, no. 5, 1953.

20. Krishnamoorthy, C., and Overstreet, R., An experimental evaluation of ion exchange relationships. "Soil Science", 69, 1950.

21. Lange, E., and Verwey, R. J. W., Kruit H. R., "Colloid Science" 1, 1952.

22. Mattson, S., "Journ. of Agric. Research", 33, 1926.

23. Mukherjee, J. N., Chatterjee, B., Ray, A., Liberation of H, Al and Fe ions from pure clay minerals on repeated salt treatment and desaturations. "Journ. Colloid. Sciences", 3, 1948.

24. Szabo, Z., Csanil, L., Kavai M., A femhidroxid csapadekok oldeonysagi czorzatanak meghatarozasa. "Magyar kemiai folyoirat", 59, no. 10, 1953.

25. Wiegner, G. und Pallmann H., Uber Wasserstoff and hydroxylschwärmionen um suspendierte Teilchen und dispergiarte Ultramikronen. "Koll. Stschr.", 51

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Sizov, I. A.

Itogi i perspektivy nauchnoi raboty.

[Results of scientific work and its prospects].

Nauka i Peredovoi Opyt v Sel'skom Khoziaistve, no. 1, p.25-27, Jan. 1956. 20 M222

(In Russian)

... Considering the great importance of expanding the seedling of maize and of adapting it to new districts, the Institute [All-Union Institute of Plant Industry], sent more than 10.5 thousand varietal samples of this crop, diverse in early ripening and in biological and economic properties, to the different zones of the country for seeding in 1955. Owing to this, varieties best suited for the different new cultivation districts have to a considerable extent been developed within one year's time.

Concomitantly with the gathering of plant resources within the country, the Institute receives a considerable amount of seed from foreign countries by way of exchange. In 1955 it received about 3000 samples of seed of various crops from 31 countries. The Institute, in turn, sent in 1955 over 2000 seed samples from its own collection to 29 countries.

At present the Institute has a collection including approximately 160 thousand varieties and forms chiefly of cultured plants. Their economic characters and physiological and biochemical properties are studied at 14 experimental stations of the Institute located in different geographical zones of the USSR under diverse conditions.

A 803

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

A study of plant resources is conducted at the experimental stations of the Institute concomitantly with selection and seed growing work. In preceding years, important work was done in the study of collections and in the production of interlinear maize hybrids. As a result of this work, the interlinear hybrids VIR-42, VIR-25, VIR-37 and VIR-156 were obtained and are [now] being adapted to production.

Due to the fact that seeding of maize from hybrid seed had been considerably increased, [Begin p.26] the work of selection and seed growing of this crop was expanded in the year 1955.

Besides the Kuban Experimental Station, this work was done at the Ustimov Experimental Station (Poltava Oblast), the Central Asian Experimental Station, at the Sverdlovsk Branch of the Institute, and the Pushkin and Pavlov Experimental Bases of the Institute (Leningrad Oblast). The work of creating interlinear hybrids is done at a rate calculated to bring the cropping area under hybrid seed of the varieties indicated above to no less than 5 million hectares within the next 2-3 years.

Concurrently with the considerable expansion of work devoted to the production of hybrid seed of maize, the staff of the Institute is creating new varieties for the old as well as for the new districts cultivating this crop.

In 1955 the Institute tested a large number of maize varieties for the purpose of developing the best among them for the new maize growing districts. There are a series of early ripening varieties that produce ears in many oblasts of the non-black soil belt, but these varieties usually are not sufficiently productive and the yield of their green mass is small. Cultivation of such varieties is not profitable. On the other hand, in oblasts of the non-black soil belt, late ripening varieties produce high yields of green mass, but no ears that mature up to the milk-wax stage.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Oblasts of the non-black soil belt must have varieties that combine early ripeness with a good yield of green mass.

A better means of obtaining such varieties of maize is to develop intervarietal hybrids by crossing early ripening varieties with late and intermediate ripening ones. In the year 1955, considerable work of crossing was done at the experimental stations of the Institute (Pushkin, Pavlov and Ustimov). More than a hundred varieties of early ripening, intermediate ripening and late ripening [maize] were used for this purpose. By combining different varieties, the hybrid seed material obtained will permit developing in 1956 more valuable hybrids for the different oblasts of the non-black soil belt. The hybrids will be tested extensively in 1956 at experimental stations and on kolkhozes and sovkhozes. The task ahead is to produce interlinear hybrids within the next 2--3 years, that ripen early (maturing up to the milk-wax stage and complete ripeness) and give a large yield of green mass.

It is known that maize is a warm-climate plant. At low temperatures (below 8--10 degrees C) it develops poorly and often perishes, hence it is important to increase its cold resistance. In 1955, the Institute was conducting work to raise the cold resistance of maize varieties by exposing seed to the influence of low temperatures before it was seeded. The first experiments produced positive results. The plants which grew from the seed exposed to the influence of low temperatures were more vigorous and developed more rapidly than the usual kind. By this means a good yield of ears and green mass was obtained from the seed of hybrid VIR-42 in the Leningrad oblast. The yield of the green mass comprised 300-400 centners per hectare...

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Vavilov, S. I., and Topchiev, A. V.

O nedostatkakh v rabote Pochvennogo instituta Akademii nauk USSR. (Postanovlenie Prezidiuma AN USSR ot 25/VIII 1949).

[On shortcomings in the work of the Soil Institute of USSR Acad. of Sciences. (Resolutions of the Presidium of the Acad. of Sciences of USSR of August 25, 1949)].

Selsk. i Semen. v. 16, no. 10, p.69-70, Oct. 1949. 61.9 Se6

(In Russian)

In the light of historic resolutions of the Party and of the Government, which were adapted in the last few years in the field of reorganization of the socialistic agriculture by introducing a system of grassland farming and by implanting into the agricultural production the achievements of the Soviet biological science, which were created by the labors of outstanding Russian scientists, Dokuchaev, Kostychev, Williams, Timiriazev, Michurin and Lysenko, the scientific work of the Soil Institute "im. Dokuchaeva" acquires an exclusive meaning.

Being a leading Institute, which was called to develop the teachings of Dokuchaev-Kostychev-Williams about the soil, and to practically help our country in the further increase of soil fertility and in the raising of the yielding capacity of sovkhoz and kolkhoz fields. The Soil Institute must so arrange its work, as to become a true center for the most advanced soil science in the world, which has been created in our country, and which has an aim to help one further movement towards communism.

A 804

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Although the Soil Institute "im. Dokuchaeva", which has in its staff highly-qualified personnel, and which attained in its work many positive improvements and progress, yet, on the whole, the reorganization of its work on the basis of the latest resolutions of the Party and of the Government, of the resolutions of the August session of VASKhNIL (1948), and the decisions of the extended Conference of the Presidium of AN USSR in August, 1948, proceeds slowly and unsatisfactorily.

The presence of serious deficiencies in the work of the Soil Institute was noted of late in several critical articles in the press, which correctly discovered serious errors and blunders, which were perpetrated by individual scientific coworkers of the Institute, as well as by the leaders of the Soil Institute as a whole.

The most important deficiencies in the work of the Soil Institute "im. Dokuchaeva" are the following:

1. In the scientific work of the Institute they did not as yet learn to appreciate enough and to build up the teachings of Acad. V. R. Williams about the unitary soil formation process and about the system of grassland farming as a foundation for increasing the soil fertility.

2. The Soil Institute, in several sections of its scientific activity, is separated from the production problems of the soil science, as a science which is called upon to theoretically formulate practical methods for the increase of soil fertility, and thus create high and stable crop yields.

3. The Soil Institute, in many divisions of its work, is not cooperating sufficiently with the Ministries, with VASKhNIL, with central and local organizations, which are the leaders in the practical agricultural activity of the country.

4. The Soil Institute did not form a sufficiently close scientific

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

collaboration with institutions of biological sciences of the Department, and, especially, in the complex work on theoretical foundations for the creation of high and stable crops.

5. Criticism and self-criticism are very poorly developed in the Soil Institute, and often there is even a clamp put on the criticism and self-criticism by a small group among the leading cadres of the Institute.

6. Delay and the presence of important errors, which often have a sense of principle, were permitted in the field of the most important work of the Institute on compilation of the governmental soil map.

7. The journal "Pochvovedenie" has not as yet become a fighting organ of the press called to illuminate and to popularize the teachings of Dokuchaev-Williams about the soil and to mobilize the scientific Soviet world for the fulfilment of the most important problems in introducing the grass-land farming system, field protective shelterbelts, the raising of soil fertility, and others.

The AN Presidium decrees:

1. Taking into consideration, that the biological trend in soil science, which was established by V. R. Williams can achieve its fullest development only under conditions of a closely linked work of the Soil Institute with the work of other scientific biological institutions, to entrust the Institute's board of directors, together with public organizations and the Bureau of the Department's geological-geographical sciences, to consider the question of transfer of the Institute from the Department of Geological-Geographical Sciences into the Department of Biological Sciences.

2. With the aim of improving the work of compiling the governmental soil map to oblige the board of directors of the Institute to make preparations this

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

fail to call a conference on the soil map bringing together local workers, as well as those from the Ministry of Agriculture, specialists from VUZ's [Institutions of Higher Education], and from scientific-research institutes.

3. To offer to the Soil Institute to organize the main editorial office for the governmental soil map, coordinating its staff, as well as the course and methods for doing the work with appropriate departments and ministries. [Begin p.70].

4. In order to radically improve the work of the journal "Pochvovedenie" to hold it necessary to reorganize the editorial staff of the journal by attracting to it representatives of ministries, of MGU [Moscow State University], of TSKhA [Timiriazevskaia Agricultural Science Academy] of biological institutions of AN USSR, and others, to put the journal in a position quite independent of the Soil Institute and to change it into a leading, fighting organ of the Soviet biological soil science.

5. To entrust to the leadership of the Institute, together with public organizations, to reconsider the personnel of the scientific staff of the Institute by getting rid of workers of little value, which do not answer the business or political requirements, as well as of a great number of workers who are close relatives, replacing them by young coworkers and practical workers in the field of soil science and agriculture.

6. In order to consolidate the leadership of the Institute to entrust the Institute's director and the administration to find highly qualified scientific workers for the position of a deputy director for the Scientific Section, and of a learned secretary.

7. To revise the body of the Organization Committee of the Society of Soil Scientists and to give rise to a petition for calling in 1950 an All-Union Conference of Soil Scientists for the election of the leading members of the Society.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

8. To oblige the Institute's board of directors to conduct a board meeting of the Academic Board of the Institute together with the active members for a discussion of the present resolution, as well as of materials which were published in the press, and to plan some measures for the reorganization of the work of the Institute.

9. The present resolution should be published in the journal "Pochvovedenie" and must be brought to attention of the "Literaturnaia gazeta", and of the journals "Selektsiia i Semenovodstvo" and "Sovetskaia Agronomiia", which have published critical articles concerning the work of the Soil Institute.

Deputy President of the Academy of Science of USSR, Acad. S. I. Vavilov

The Chief Learned Secretary of the Presidium of the Academy of Science of USSR, Acad. A. V. Topchiev.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

A-805
(In full)
vg/A

Poliakov, I. M.

Uluchshith planirovanie i organizatsiiu issledovanii.

[Improving the planning and organization of research].

Zashchita Rastenii ot Vreditelei i Boleznei, vol. 1, no. 5, pp. 3-4. Nov.-Dec. 1956. 421 Z1

(In Russian)

Reduction of losses caused by pests and plant diseases is a great potential for increasing the gross yield of agricultural crops. It must be admitted that this possibility is not utilized to the extent required, and the losses of yield suffered by agriculture continue to be very severe. Thus, according to the figures of the All-Union Institute of Plant Protection, the yield losses of grain crops in the Union inflicted annually by the combination of pests, diseases and weeds exceed a billion puds [one pud = 36 pounds] of grain. The losses of cotton amount to approximately 14% of the total production, and in the realm of fruit-growing the losses (at storage prices [v zagotovitel'nykh tsenakh]) reach 19 billion rubles. Elimination of existing losses caused by pests and diseases can be accomplished in a short time by improving the organization of operational work, by supplying farms with more effective poison chemicals and machines, by raising the level of scientific investigations, and by increased introduction of scientific achievements in to practice.

One of the essential conditions for the solution of these problems is correct and precise planning of measures.

A 805

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Problems pertaining to the planning of research in plant protection have long since been a source of anxiety for the Party and the Government.

The All-Union Lenin Academy of Agricultural Sciences imeni V. I. Lenin has in recent years been organizing annual all-union program and methodology conferences for the coordination of scientific investigations conducted by plant protection establishments of the different departments. The conferences have played an important role in determining the main course of the investigations. They have been very useful from a methodical point of view, and have improved the personal contacts between scientific and practical workers; this is especially important where regular plant protection congresses do not take place and where reciprocal informational literature concerning the work conducted by central and peripheral organizations is scarce. These conferences have also provided [an opportunity] to consider in open discussion the more factual problems of science and practice and to approve newly proposed measures. At the same time, the work of the past eight program and methodology conferences held for the protection of plants had a number of shortcomings. A big disadvantage was the absence of a State plan for research in the realm of plant protection which makes its implementation by all organizations mandatory and which provides for the solution of the more factual problems as well as for the means of resolving them. Another serious shortcoming was the absence of a commitment for the implementation of conference decisions by institutions which are not part of the VASKhNIL [All-Union Academy of the Agricultural Sciences imeni Lenin] system. Many of these [institutions] presented to the conferences plans that had already been confirmed by their own departments and they merely requested that the plans be approved and registered. Many organizations sent plans and records much too late and often in a form that made the rendering of a qualified conclusion

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

impossible. Besides, the Plant Protection Section of VASKhNIL had failed to organize inspection of the implementation of plans that had been discussed and approved [tematicheskie plany].

The lack of interest in the work of the above conference by the Main Administration for Agricultural Science of the Ministry of Agriculture USSR must be noted as a serious drawback. In a number of cases, this was apparent in the underestimation of the importance of the conference and especially in the lack of interest in providing organizational and technical plans for scientific research work in the sphere of plant protection in institutions subordinate to this Administration. Furthermore, instead of strengthening the scientific-research network of institutions dealing with plant protection, it was sharply reduced. For example, one need but to point out that within the All-Union Scientific-Research Institute of Agro-Forest Improvement the Section of Plant Protection composed of 6 men has been completely eliminated. At the All-Union Scientific-Research Institute of Flax [and] at the Scientific-Research Institute of Agriculture for the South-East the Sections of Plant Protection have been sharply reduced and are now represented solely by one senior science fellow.

Recently, considerable changes were made in the organization of scientific institutions for agriculture. [Begin p.4]. A network of zonal institutes created throughout the Soviet Union was made responsible for developing zonal systems of farm management. The management of all branch institutes has been turned over to the All-Union Lenin Academy of Agricultural Sciences imeni V. I. Lenin where a Plant Protection Section has been established within the Division of Agriculture. All of this certainly builds a sound foundation for a radical improvement in planning and inspection as well as in organizing research for plant protection. The establishment of

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

plant protection sections in zonal institutes is to provide for the development of systems of plant protection measures that are appropriate for a given zone and are economically advantageous. To enable them to fulfill these important tasks, the sections of plant protection of the zonal institutes were given organizational, financial and methodological jurisdiction over the plant protection sections of local agricultural experimental and selection stations. Apart from this, the plant protection sections of branch institutes will assist the zonal institutes when special problems arise. Organization carried out along these lines will insure better planning of investigations which will concentrate on the use of chemical means in conjunction with agrotechnical and prophylactic measures, and not on a onesided devotion to chemical methods only, as it is practiced now in a number of cases. It must be noted that the Presidium of VASKhNIL has considered seriously the strengthening of plant protection sections of its subordinate branch institutes. The staffs of workers in plant protection sections have been considerably enlarged at the All-Union Scientific-Research Institute of Maize, the All-Union Scientific-Research Institute of Sugar Beets, the All-Union Scientific-Research Institute of Forage imeni V. R. Wil'iams etc. It is to be assumed that the situation in the plant protection sections and in the zonal institutes under the jurisdiction of the Main Administration of Science of the Ministry of Agriculture USSR and at the Ministries of Agriculture of the Republics will be considerably improved within the near future.

The reorganization of the scientific-research network and the existence of the five-year topic-problem plan for plant protection adopted in June 1956 by the All-Union Conference of Workers of the Agricultural Sciences will make it possible to conduct the next regular (ninth) conference on planning and methodology on new principles. The fundamental task of the conference will be the creation of a State plan for scientific research in plant pro-

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

tection for the year 1957. In the plan, special attention must be directed toward the development, adaptation and economic evaluation of the zonal systems of plant protection measures. For the Conference, zonal and branch institutes will, concomitantly with the development of zonal systems of pest and disease control, have to work out a plan of scientific-research work for plant protection in a given zone including the more important and factual problems that could be incorporated in the Union-wide State plan. At this conference it will be necessary to discuss problems of plant protection economics and, particularly, of methods of calculation and evaluation of losses and of the economic effectiveness of the different measures.

As a result of the reorganization of the signalization [warning] and prognosis service, at the Conference much attention will have to be devoted to the theoretical side of this matter and to an exact definition of practical prognostication methods.

In contrast to the years past, a new plan must be compiled for the introduction of scientific achievements in to production. The introduction plan will be different in so far that its realization will depend not only on science, but, to a large extent, on the Ministries and departments responsible for providing new means for operational measures and new technics for the control of plant pests and diseases.

At the Conference for Planning and Methodology it will necessary to consider the question of the desirability of compiling separate plans for the introduction of scientific achievements. It is quite probable that scientific achievements for plant protection will have to be incorporated in the zonal systems of agriculture and introduced into production in conjunction with these systems.

The problem of working out a full-value plan for plant protection research and its effective implementation is a matter for the collective efforts

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

of scientific and practical workers. There is no doubt that joint effort will create a plan that will answer the requirements of the country's socialist agriculture.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

A-806
Table of contents only
VS/A

A 806

Kukuruza v 1955 godu.

[Maize in the year 1955].

Moskva, Gosudarstvennoe Izdatel'stvo
Sel'skokhoziaistvennoi Literatury,
1956. 4v. 59.8 K952

(In Russian)

Table of Contents
Vol. 1

NON-BLACK SOIL ZONE

From the publishers ---------- 3

Martynov, V. M. Characteristics of meteorological conditions of maize growth and development in the non-black soil zone ------ 7

Baliura, V. I. What does the experience of growing maize in the non-black soil zone in 1955 teach? ---------- 16

Kalinin, M. S., and Kochkin, I. F. Maize varieties in the non-black soil zone ---------- 40

WHITE RUSSIAN SSR

Borisevich, I. What practice of maize cultivation in White Russia indicates? ---------- 55

Ognev, I. M. Growing high yields of maize on peat-bog soils in White Russia ---------- 60

Gaaz, O. G. Maize in the North of White Russia ---------- 70

Orlovskii, K. P., and Gorelik, L. Ia. Let us use our accumulated experience in maize growing ---------- 75

Belkov, V. B. Our experience in growing maize seed ---------- 86

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

LITHUANIAN SSR, LATVIAN SSR, ESTONIAN SSR

Izbitskii, Kh. I., and Aleksonis, I. Maize in the Lithuanian SSR 93

Samulenis, P. For high yields on large areas ---------- 99

Batenas, S. We shall prevent the recurrence of mistakes ---------- 104

Kriukialis, B. What practice of the "Raudonoii veliava" kolkhoz in the Lithuanian SSR indicates? ---------- 106

Iushtel', P. What experience of the "Dzirketele" kolkhoz teaches 110

Veinberg, V. What does maize give us? ---------- 116

Priilinn, O., and Rivis, A. Maize in the Estonian SSR ---------- 121

Rooni, Sale. One hundred centners of ears and 940 centners of green mass per hectare: author is a member of the young people's maize growing group on the "Sirius" kolkhoz, Antslask District, Estonian SSR. ---------- 129

LENINGRAD, NOVGOROD, KALININ AND SMOLENSKI OBLASTS

Popov, G. I., and Fomina, S. K. Varieties and hybrids of maize for the Leningrad Oblast ---------- 135

Rakhmanina, G. Ia. Influence of pre-seeding treatment of seed upon maize yield ---------- 141

Surin, P. Ia., and Gapochka, L. I. Maize in the Kalinin Oblast - 144

Kuz'mian, Z. G. Some biological characteristics of maize when grown in the Kalinin Oblast ---------- 157

Shushakov, A. What the results of work of two Kashin kolkhozes indicate ---------- 164

Bezobrazov, A. C. Maize on the "Novaia zhizn'" kolkhoz, Zubtsov district, Kalinin Oblast ---------- 167

Nesterov, I. Maize on kolkhozes and on test plots of Smolenshchina ---------- 170

Bobov, N. P. Maize in the Monastyrshchin district, Smolensk Oblast ---------- 177

Tiatin, I. G. How we grow maize ---------- 181

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Shapiro, I. D. Maize pests of the Leningrad and some other oblasts of the non-chernozem zone and measures for their control ----- 184

MOSCOW, VLADIMIR, YAROSLAVL, IVANOV AND KOSTROMA OBLASTS

Masterova, V. P. Maize in the vicinity of Moscow ---------- 199

Shevolin, V. I. Maize has increased milk production by 600 kilograms ---------- 208

Gorbatenko, G., and Medvedev, B. Instructive experience in maize cultivation ---------- 210

Smirnov, A. F. Maize on our kolkhoz ---------- 221

Korsakov, I. E. Maize in the Vladimir Oblast ---------- 225

Illarionov, V. F. Maize in the Yaroslavl Oblast ---------- 228

Ioannisian, S. L., and Artamonova, E. G. Experience in growing maize at the All-Union Station of Animal Husbandry ---------- 235

Stepanova, E. I. How we grew a high maize yield ---------- 248

Morozova, Z. V. Maize in the Ivanov Oblast ---------- 251

Emel'ianov, I. I. The yield could have been higher ---------- 261

Sokolova, A. Our experience in growing maize ---------- 265

Davydov, N. M. Maize varieties for the Kostroma Oblast ---------- 268

Shishina, S. I. Maize on the "12th of October" kolkhoz ---------- 276

VOLOGDA, KIROV, MOLOTOV OBLASTS IN THE NORTHERN NON-CHERNOZEM REGIONS OF THE BASHKIR AUTONOMOUS SSR

Volkov, N. K. A high maize yield can be obtained even in an unfavorable year ---------- 283

Gmyzin, I. A. Seven hundred fifty centners of green mass and 60 centners of ears per hectare ---------- 286

Borodin, I. T. Some problems of maize cultivation in the Kirov Oblast ---------- 287

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Zelenin, I. This is a matter for hands that care ---------- 300

Chudinov, A. G. From experience of cultivating maize in the Molotov Oblast ---------- 302

Zasypkin, P. Mistakes made in maize growing in the Molotov Oblast ---------- 303

Burangulova, M. N. Phosphorobacterin as a means of increasing maize productivity in the non-chernozem districts of Bashkir 307

Elsakova, T. N. Use of benzene hexachloride in the control of maize pests ---------- 314

KALUGA, TULA AND RIAZAN OBLASTS; MORDOVIAN AND CHUVASH AUTONOMOUS SSR

Shefer, A. I., and Gubin, K. M. Influence of fertilizers upon the yield of maize ---------- 319

Pil'kov, V. I. Maize on peat-podzolic soils in the Kaluga Oblast 324

Budiuk, V. P. Maize in the Tula Oblast ---------- 327

Khrapkov, S. A. Year of struggle in obtaining maize yield ---------- 339

Kravtsov, A. V. Maize in Mordavia ---------- 346

Nikitenko, G. F. Agrotechnics and maize varieties in the Mordavian Autonomous SSR ---------- 348

Fedotov, Ia. F. Experience in obtaining high yields of maize in the Chuvash Autonomous SSR ---------- 353

Koroshkov, S. K. Maize on the imeni Stalin Kolkhoz ---------- 359

* * * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Vol. 2

DISTRICTS OF THE CENTRAL CHERNOZEM ZONE

Kotov, P. F. Maize in the central chernozem zone ---------- 5

Fedin, M. A., and Synzynys, I. Z. Agrotechnics of maize in the Orlov Oblast ---------- 25

Semenov, Z. E. A backward kolkhoz became a leading one (the "Put' k kommunizmu" kolkhoz of the Mtsensk District, Orlov Oblast) -- 30

Gladkii, M. F. Maize in the Lipetsk Oblast ---------- 34

Kositsin, D. N., and Miromskii, I. I. Experience in growing maize in the Tambov Oblast ---------- 43

Spitsyn, V. P. Maize varieties for the Tambov Oblast ---------- 46

Grekov, A. N. Some problems of maize agrotechnics ---------- 51

Lisitsyn, B. P. Work with maize at the Morshansk Selection Station 55

Kopnin, V. P., and Korunenko, E. I. What did maize give us? (Kolkhoz imeni Kalinin, Rzhakseinsk District, Tambov Oblast) ------- 61

Podkhvatilin, V. A., and Konevega, D. P. More maize should be sown ("Maiak" sovkhoz, Rzhakseinsk District, Tambov Oblast) ---------- 64

Popel', E. A. Experience in obtaining a high maize yield (sovkhoz imeni Stalin, Shul'ginsk District, Tambov Oblast) ---------- 66

Alekseeva, A. O., Annenkova, Z. M., and others. Cultivating maize in the Kursk Oblast ---------- 69

Feitsarenko, A. I. Study of maize varieties at the L'gov Experimental-Selection Station in 1956 ---------- 83

Vanin, D. E. Increasing the production of grain and of produce for livestock (the "Rodina Khrusheheva" kolkhoz, Khomutov District, Kursk Oblast) ---------- 84

Kovalev, N. L. Maize on our kolkhoz (Kolkhoz imeni Karl Marx, Oboiansk District, Kursk Oblast) ---------- 87

Chulkov, N. F. One hundred ten centners of ears per hectare ------- 90

Mamoshin, I. F. There cannot be a good yield of maize without the proper agrotechnics ---------- 92

Peareva, M. M. Results of selection work with maize ---------- 93

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Masandilov, E. S. Supplementary artificial pollination of maize 99

Nenarokov, M. E. Use of flooded lands for seeding maize ---------- 100

Kotova, G. P. Cultivating maize for green fodder ---------- 106

Sukharev, E. P., and Koriagin, A. N. Irrigation of maize ---------- 112

Tselinova, L. A. Chemical weed control in maize crops ---------- 118

Kozhevnikova, L. M. Measures for the control of common smut [Ustilago zeae] of maize ---------- 120

Pavlov, I. F. Methods for the control of the Swedish fly [Oscinisoma (Diptera)] and other pests ---------- 124

Gorin, D. P. A highly productive crop (kolkhoz imeni Molotov, Semiluk District, Voronezh Oblast) ---------- 127

Isaenko, N. N. Maize - principal crop on our kolkhoz (kolkhoz imeni Lenin, Khrenovsk District, Voronezh Oblast) ---------- 131

Tereshchenko, F. Komsomol [Young Communist League] youth groups struggling for a high maize yield (the "Pobeda" kolkhoz, Korotoiaksk District, Voronezh Oblast ---------- 136

Sedakov, D. E. A crop of great possibilities (the "Pamiat' Kirova" kolkhoz, Budennov District, Belgorod Oblast) ---------- 140

Narozhnii, S. P. Maize on our fields (kolkhoz imeni Bulganin, Bol'she-Troitsk District, Belgorod Oblast) ---------- 143

Shevtsov, I. S. A kolkhoz has increased the production of grain (kolkhoz imeni Kalinin, Bobrovo-Dvorsk District, Belgorod Oblast) ---------- 144

Zozulia, I. M., and Danilenko, T. A. What has maize given to our kolkhoz? (Kolkhoz imeni Kirov, Borisov District, Belgorod Oblast) ---------- 145

DISTRICTS IN VOLGA AREA

Filatov, F. I. Experience in cultivating maize in the Volga area in 1956 ---------- 151

Valeev, Sh V. Maize in the Tartar Autonomous SSR ---------- 174

Mosunov, A. Maize growing on advanced farms ---------- 179

Akhmetov, Kh. N. Maize agrotechnics in the Ul'ianov Oblast ------ 181

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Semenov, V. A wide open road for maize (Pamiat' Il'icha" Kolkhoz, Cherdak District, Ul'ianov Oblast) ---------- 187

Kiselev, P. O. Ninety centners of ears per hectare. Kolkhoz imeni Stalin, Mainsk District, Ul'ianov Oblast) ---------- 188

Inkin, D. N. Maize helped to increase milk production ("Put' k Kommunizmu" Kolkhoz, Astradamov District, Ul'ianov Oblast) ------- 189

Riabov, I. E. Maize in the Kuibyshev Oblast ---------- 190

Kozeev, V. I. Some problems of maize agrotechnics in the Kuibyshev Oblast ---------- 193

Orlov, V. N. Maize varieties in the Kuibyshev Oblast and the preparation of seed for seeding ---------- 196

Danilov, P. A profitable crop (Kolkhoz imeni Malenkov, Petrov District, Kuibyshev Oblast) ---------- 202

Stepanov, A. N. A kolkhoz has increased the amount of silage 16 times (the "Leninskii put'" kolkhoz, Borsk District, Kuibyshev Oblast) ---------- 204

Semenova, S. E. Results of work with maize (Petrov State Selection Station) ---------- 205

Sutyrin, E. How we grew a high maize yield (the "Krasnyi Oktiabr'" Kolkhoz, Bekovsk District, Penzensk Oblast) ---------- 209

Ivanov, I. I. Maize under conditions of severe drought ---------- 210

Shanskii, Iu. Maize in the Chkalov District ---------- 212

Goriachev, I. Three hundred eighty centners of green mass of maize per hectare (Kolkhoz imeni Lenin, Mordovian-Boklinsk District, Chkalov Oblast) ---------- 216

Livanov, K. V. Maize in the Saratov Trans-volga ---------- 217

Irisov, I. Ia. Maize helped to increase grain production and to strengthen the forage base ("Balandinskii" Sovkhoz, Saratov Oblast) ---------- 228

Likhanin, P. The main link - maize (Kolkhoz imeni Frunze, Voroshilov District, Saratov Oblast) ---------- 232

Potapov, P. E. Advanced experience of A. T. Fomina's group (Kolkhoz imeni Stalin, Khvalynsk District, Saaratov Oblast) ------- 234

Mishchenko, V. L., and Baranova, N. L. One hundred seventy one centners of maize ears per hectare (Kolkhoz "Krasnyi Oktiabr'", Rodnichkov District, Balashov Oblast) ---------- 238

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Solomin, Kh. G. Use of maize in fattening swine for meat ("Smychka" Sovkhoz, Balashov District, Balashov Oblast) ---------- 240

Kononov, M. S., Terent'eva, Z. A., and others. Maize on kolkhozes in the North-West districts of the Stalingrad Oblast ---------- 242

Kononov, M. S. Maize at the Stalingrad State Selection Station ----- 245

Svinarev, V. I. Maize in the Astrakhan Oblast ---------- 249

Kuznetsov, M. Commitment fulfilled (Kolkhoz imeni of the Six Slain Communists of the Narimanov District, Astrakhan Oblast) -------- 260

Vol. 3.

SOUTHERN REGIONS OF THE USSR

From the Publishers ---------- 3

Kalinin, M. S. Hybrid maize in southern regions ---------- 9

UKRAINIAN SSR

Musiiko, A. C., Kliuchko, P. F., and Bakalo, A. N. Growing of maize and its harvesting in the milk-wax stage ---------- 31

Bugai, S. M., and Musitov, G. I. Dense seeding of maize with other crops ---------- 43

Musiiko, A. S., Kliuchko, P. F., and Bardanov, M. I. Maize - a valuable preceding crop for winter wheat ---------- 65

Bugai, S. M. Characteristics of maize agrotechnics in the forest-steppe and wooded districts of the Ukrainian SSR ---------- 66

Penchev, P. Two hundred twenty five centners of maize per hectare - 85

Matinko, Iu. What we derive from dense seeding ---------- 87

Doliniuk, E. A. My working experience ---------- 89

Kotovskii, I. One hundred centners of maize ears per hectare ------ 92

Ozernyi, M. E. My experience in growing high maize yields -------- 95

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Kozyr', A. Maize on the test plots of the Dnepropetrovsk Oblast 102

Bugutskii, A. A. Growing maize on the kolkhoz imeni Stalin, Krasnolimanskii District, Stalin Oblast 104

Gomlia, V. Maize - our wealth 112

Meksin, D. Material incentive of kolkhozniks for maize production 115

Sova, M. Our experience in cultivating maize 118

Fedulaev, A. A., and Musiiko, A. S. Means of increasing maize productivity in the Odessa Oblast 122

Isarov, Iu. T. High yields of maize hybrids 127

Isarov, Iu. T., and Krivetsker, I. F. Varieties and hybrids of maize on the test plots of the Odessa Oblast 135

Protsenko, M. S. 73.4 centners per hectare of maize grain 145

Korneichuk, P. A. Experience of my group 150

Suslov, V. M. Maize and the prospects for its cultivation in Kuban 159

Revin, B. T. Potentials for obtaining high maize yields in Kuban 166

Khizhniak, V. A. Maize - most important forage crop in Kuban 183

Volodarskii, N. I., Ulitin, A. M., and Gubanov, Ia. V. Basic features of maize agrotechnics in Kuban 195

Drogalin, P. V. Work on maize agrotechnics at the Krasnodar Selection Station 219

Khadzhinov, M. I., and Galeev, G. S. Maize selection and seed growing in Kuban 233

Ter-Danielian, V. M. Maize in mowed and stubble fields - basic crop for green conveyer [continuous green fodder] 273

Gavrilov, V. P. Stubble crops of maize 281

Orlov, V. Stubble crops of maize at the Poroshinsk MTS 289

Seroshtan, I. K. District of high maize yields 290

Pal'mak, V. I. High maize yields on the kolkhozes of the Dinsk MTS 297

Filonova, M. I., and Zhuk, F. E. Maize on the imeni Khrushchev Kolkhos, Samarsk District, Rostov Oblast 309

Ganzin, Ia. One hundred fifty centners of maize ears per hectare - 515

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Borshchevskii, P. Valuable experience of combine operator P. E. Zinchenko. ---------- 320

Darakov, N. How combine operator Nikolai Sakhan' is working ------- 322

Salamov, A. B. Maize in northern Ossetia ---------- 329

Tamaev, M. A. How we increased the yield of maize grain 2 1/2 times in one year ---------- 360

Gis, V. G., Kuts, Z. S., Bakhvalov, Iu. A., and Belous, P. E. High maize yields on irrigated lands ---------- 365

Kondratov, P. P. Ninety centners of maize grain per hectare ------- 378

Vol. 4.

URAL, NORTHERN KAZAKHSTAN, SIBERIAN AND FAR EASTERN REGIONS

URAL REGIONS

Klimashevskii, E. L. Some characteristics of maize cultivation in the Sverdlovsk Oblast ---------- 5

Onorin, P. M. Why many kolkhozes in the Sverdlovsk Oblast produced low maize yields ---------- 9

Makhotkin, I. P. Maize in the western regions of the Urals --------- 11

Evdokimova, L. Our experience ---------- 16

Tatarintsev, A. I. Maize agrotechnics in the Bashkir Autonomous SSR 17

Davydov, A., and Ardashev, M. Maize on test plots of the Bashkir Autonomous SSR ---------- 22

Orlov, B. Maize - a promising source of fodder ---------- 26

Fol'mer, N. Some questions of maize agrotechnics in the southern Trans-Ural area ---------- 28

Klimov, Ia. I., Kushnirenko, Iu., and Ermolaeva, A. Our experimental work with maize ---------- 31

Kuznetsov, P. I. Our investigations of maize cultivation --------- 38

Sirotin, G. On the Makushinsk experimental field ---------- 41

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

REGIONS OF NORTHERN KAZAKHSTAN

Krest'ianinova, K. T. Maize in the Kustanaisk Oblast ---------- 47

Siundiukov, Kh. Maize in North Kazakhstan ---------- 50

Vunder, Ia. How we succeeded in producing a high maize yield ------ 55

Chernov, N. Maize - on flood plains ---------- 55

Zaitseva, A. From experience in cultivating maize in the Karagandinsk Oblast ---------- 58

Rafienko, M. A., Kandaurov, L. G., and Shmidt, M. V. Maize in the Semi-palatinsk Oblast ---------- 65

Taksaev, G. Our experience in maize growing ---------- 73

Iskakov, Baidrakhman, Results of good tending ---------- 74

Efimov, M. How we succeeded in producing a high maize yield ------ 75

Gorst, G. Best maize varieties for kolkhoz fields ---------- 77

Mashtakov, F. M. Maize in Eastern Kazakhstan ---------- 79

SIBERIAN AND FAR EASTERN REGIONS

Belosorov, A. T. Problems of maize agrotechnics in the Omsk Oblast ---------- 89

Filimonova, T. G., and Iakhtenfel'd, P. A. Experience in storing maize seed ---------- 96

Zakharov, V. V. Some problems of cultivating maize in the Novosibirsk Oblast ---------- 99

Ognev, A. Two agrotechniques - two results ---------- 106

Ovsiannikov, V. I. Maize in the northern regions of the Tomsk Oblast ---------- 108

Adamovich, A. Maize at the Kemerovo State Selection Station in the year 1955 ---------- 117

Khomenko, A. A. Experience in growing maize in the Kulundinsk Steppe ---------- 122

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Zolotov, M., and Solom'iana, I. Our experience in cultivating Altai mountain [gorno-altaiskaia] maize ---------- 127

Trusov, P. S. What maize gave to the kolkhoz ---------- 132

Durachenko, D. Maize - our wealth ---------- 134

Rumiantseva, Z. A. First experience in cultivating maize ---------- 143

Barnakov, N., and Kleev, M. What the first year of maize growing in the Buriat-Mongolian ASSR has demonstrated ---------- 148

Tiumentsev, V. Maize in Kishing ---------- 151

Kanutonova, A. I. Cultivating maize in the Chitinsk Oblast ---------- 156

Dadykin, V. P. Maize in the North ---------- 158

Malysh, K. K., Mouseenko, V. I., and Sarapulova, G. S. Cultivating maize in the Amur Oblast ---------- 161

Sibirtsev, I. Maize has been thriving splendidly ---------- 167

Volvozhenin, A. Basic problems of maize crops in Maritime Territory ---------- 170

* * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

A-807
(In full)
vg/A

A
807

Aderikhin, P. G.

Ob organizatsii pochvennoi sluzhby.

[On organizing a soil service].

Pochvovedenie, no. 3, pp.55-59,
March 1954 57.8 P34

(In Russian)

The soil - an independent historically innate body of nature, environment of plants, and a basic means of agricultural production - has long since attracted the attention of practicing agronomists and of investigators of various branches of science. The reason is quite obvious, since soil, which embodies a property as important and irreplacable as fertility, is an indispensable condition for life on earth.

Without soil the development of plants and their fixation of solar rays would be impossible, and life of beast and man would be just as impossible. Because it possesses the properties of fertility, soil became a condition for the "existance and reproduction of a number of successive generations"..., since "production of food products is the very first condition of life of the direct reproducers and of every production in general"[1]. "The earth - a great laboratory, and arsenal that supplies the means for labor, the material for labor, and a place of habitation - a basis for collective humanity"[2].

1 K. Marks, Capital, v. 3, pt. 2, 1949.

2 K. Marks, Journal "Proletarian revolution", No. 3, 1939.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Thus, soil is our greatest, irreplacable national wealth which must be studied profoundly and thoroughly, carefully safeguarded against possible depletion, and used wisely and economically.

As regards black soils, V. V. Dokuchaev, founder of scientific soil management, said that "To Russia, black soil is worth more than any petroleum, any coal, more than gold and iron ore, for it embodies Russia's everlasting, inexhaustible wealth."

It stands to reason that all other soils are valuable and all other natural resources important to our socialist economy. We must treat all of our resources with equal care, while striving to utilize them more efficiently.

In contrast to capitalistic States, our country directs all measures toward an increase in soil fertility, toward safeguarding soils against erosion processes, and toward a more efficient utilization of soils in agriculture. This is witnessed by a series of decrees issued by the Soviet Government and the Communist Party, and by the publication of a series of orders and ordinances issued by the Ministry of Agriculture.

The 19th Congress of the Communist Party of the Soviet Union has imposed grand tasks on the national economy embracing also socialist agriculture.

Summing up the decisions of the 19th Party Congress, the September Plenum of the TsK KPSS [Central Committee, Communist Party of the Soviet Union] passed a decree concerning measures for the further development of agriculture in the USSR. This decree constitutes a fighting program not only for the workers of agriculture and agronomical science, but for other branches of the national economy as well.

The tasks imposed by the September Plenum of the TsK KPSS upon agriculture compel Soviet soil science to turn to the demands of production, and to direct the efforts of soil scientists toward the solution of the most factual problems

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

of primary importance to kolkhozes and sovkhozes. To use soil, [Begin p.66] the basic means of agricultural production, properly and expertly it is essential to acquire profound knowledge of it.

For this purpose, it will be necessary to extend the study of soil within the next few years to all agricultural regions in the direction indicated in I. V. Tiurin's article dealing with the situation and problems of Soviet soil science in the light of decisions reached by the 19th Congress of the KPSS and of the decrees passed by the Plenum of the TsK KPSS, September 7, 1953, titled "Concerning measures for the further development of agriculture in the USSR", published in the journal "Pochvovedenie" No. 9, 1953 and as a leading article in "Pochvovedenie" No. 10, 1953. In addition, soil study should be directed toward the solution of concrete problems now facing agriculture and forestry.

Grass-field crop rotations are being introduced extensively on the country's kolkhozes and sovkhozes. This important measure is often carried out without due consideration of the characteristics of the soil cover and, as a result, in the chernozem zone the same crop rotation is established on different soils (powerful black soils, forest soils, eroded soils and podzolized sandy loam), using the same type of agrotechnics on all fields; such practices are radically wrong.

Lately, many kolkhozes have realized it and they are [now] approaching their superior agencies about the need for soil study on their landed property. A detailed study of the soil cover on kolkhozes and sovkhozes including the preparation of large-scale soil maps is necessary also for the planning and efficient accomplishment of irrigation, drainage, gypsum treatment of alkaline soil [solonets], liming of acid soils, adaptation of sandy and carbonaceous soils, application of fertilizers, and for other agricultural measures.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Many kolkhozes and sovkhozes do not as yet take into consideration the diversity of the soil cover in preparing plans for production and labor, and this decreases the effectiveness of the measures applied. Ignorance of one's soils, or ignoring the need for their study often leads to such undesirable results as reduced effectiveness due to deepening of the arable layer, lack of increase in yield as a result of applying the wrong fertilizer etc.

The latter circumstance is responsible for the fact that a segment of kolkhozniks and sovkhoz workers view with suspicion State planned measures, which creates an intolerable situation.

In the light of the decrees passed by the September Plenum of the TsK KPSS concerning the need for developing differential agricultural measures, taking into account soil and climatic conditions of life, the Plenum puts to soil scientists the problems of expanding cartographic work and permanent investigations on kolkhozes and sovkhozes.

How can the tasks put to agriculture and to Soviet soil science by the September Plenum of the TsK KPSS be accomplished practically? What organizational measures are required?

This, first of all, makes it necessary to think about organizing a soil service from top to bottom.

Because, until of late, soil, the basic means of agricultural production, received too little attention, field and laboratory study of soil was not conducted intensively enough, and, as a result, the attention afforded the organizing of a soil service was also too little. Meanwhile this question embodies serious defects.

For instance, it cannot be recognized as normal that zonal institutes of agriculture have no soil departments in which the study of soil should be conducted systematically through its dynamic profile in connection with the

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

new methods of increasing fertility which are being developed. Strange though it is, the Institute of Agriculture of the Central Black-Soil Belt im. V. V. Dokuchaev has no soil department, [Begin p.57] hence permanent, thorough investigations of soil fertility are not conducted in connection with the introduction of the grass-field system of agriculture.

The soil department situated heretofore in the Kamennaia Step' [Stone Steppe] was closed when the experimental station was reorganized and became the Institute of Agriculture; this certainly was a mistake.

Soil science and agrochemistry departments in the former oblast agricultural experimental stations were also closed when agricultural experimental work was reorganized in the thirties.

As a result of this the systematic study of the physical and physiochemical properties of soils, of the microbiological processes occurring within them, and of soil fertility, was discontinued; this was very detrimental to the development of the agronomic science and for kolkhoz production.

The damage was felt because the field experiments conducted in agrotechnics, selection, fertilizer application, soil improvement and crop rotations - without considering soil conditions - were empirical in character. The experiments confirmed increases in yield due to the application of some measures, but they did not explain the causes of the increase. The experiments were conducted without consideration of external environment - the soil - they were done apart from it, which was a gross methodological mistake. And all of this was due to the underestimation of soil on the part of agricultural agencies. Strange though it seems, but a whole line of agricultural experimental stations and fields have no soil maps of their fields and, therefore, it is not known on what soils experiments are being conducted.

Soils on kolkhozes are not investigated intensively enough, and there

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

where investigations have been completed, the results are not put to use.

In order to overcome defects and omissions in the study of soils, to eliminate the inability of Soviet soil science to keep pace with the demands of agricultural production, to insure that in the future our socialist agriculture develops on a sound scientific basis, it is imperative that soil service be organized along the following three lines: along the line of scientific-research institutions, along the line of oblast agricultural administrations, and along the line of machine-tractor-stations.

It is essential to have soils departments reestablished or organized anew at scientific-research branch institutes (institutes of agriculture, grain economy, pasture economy, beet economy etc.) The establishment of soils departements in institutes will make it possible to bring the theoretical beginnings under experimental work, to raise immeasurably the level of scientific investigations and to obtain more rapidly the required results and conclusions.

It is necessary to secure alsoithe organization of soil and agrochemical departments at all oblast agricultural experimental stations. Organization [of new] or the reestablishment of [former] soil and agrochemical departments at experimental stations, and the research-work which they will carry on, will provide an opportunity to organize and to carry out experiments on a higher scientific level and to adapt experimental results to production unerringly. This will preclude the recurrence of such disappointing cases as, for instance, the one that took place on the fields of the Voronezh Agricultural Experimental Station in the twenties, when the application of phosphorite fertilizer produced a good effect on yield, yet the application of the same phosphorite fertilizer to the soil of neigboring farms produced no results whatever. This is explained simply. As it was established later on, the experiments with phosphorite meal had been conducted on a leached black soil and not on deep

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

chernozems as the experimenters had presumed; its use had been recommended on deep chernozems.

It is essential that experimental stations conduct experiments on soils that are known and that they be accompanied by a study of soil processes in the dynamic profile. [Begin p.58].

In line with oblast agricultural administrative agencies, the existing soil staffs at land reform [zemleustroistvo] and crop rotation administrative agencies must not only be preserved, but must be reinforced with personnel as well as with material so they could be turned into independent departments. It is impossible to become reconciled to a situation in which many of the indicated soil staffs have no laboratories at their disposal and, therefore, are unable to define the agrophysical and agrochemical characteristics of the soils under investigation. Nor can it be acknowledged as normal when the results of soil research completed on kolkhozes are made known two years later.

The fact that many oblast administrations have no soil staffs whatever indicates an entirely abnormal situation.

Pursuant to the decrees of the September Plenum of the TsK KPSS, Machine-Tractor-Stations have been assigned a leading role in obtaining an increase in the productivity of agricultural crops on kolkhozes and in providing, simultaneously, for the growth of public livestock and of its productivity.

To enable them to fulfil these important tasks, the Machine-Tractor-Stations are being reinforced with qualified personnel.

If Machine-Tractor-Stations are to accomplish the tasks imposed on them successfully and speedily, then it is necessary that a soil service be organized on their premises and that this service be made responsible for a systematic field and laboratory study of the soils of kolkhozes which they

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

service. The soil service should be composed of a soil scientist and an agrochemist, and they should be put in charge of the soil-agrochemical laboratory constituting a scientific material basis.

With a laboratory at their disposal, the specialists indicated will be able to:

1) carry out a detailed investigations of the soils of kolkhozes serviced by MTS [machine-tractor-stations];

2) carry out mechanical and chemical soil analysis;

3) determine the most important physico-mechanical soil properties;

4) to prepare a detailed soil map on the basis of the investigations indicated; such a map is absolutely necessary for the planning and accomplishment of agricultural measures, primarily for the arrangement of correct crop rotations and for the allocation of their fields in nature;

5) conduct a systematic study of the physical and mechanical properties of all genetic soil types and their cultural variations, required for efficient agrotechnical methods (time and depth for plowing, time and methods for tending soil and plants, time of harvesting plant yield, time, rate and methods of irrigation, standards of productive capacity of tractor and fuel consumption etc.);

6) make a detailed and thorough study of the biochemical and physico-chemical soil properties in the dynamic profile which is necessary for efficient placement of fertilizers (selection of type and ratio of fertilizers, time and methods of their application and covering up);

7) study soils not yet in use for the purpose of their improvement and economical adaptation (improvement of solonets [alkaline] soils, solonchak [saline] soils, carbonate soils, sod-podzolic, bog-meadow, peat-bog soils, red soils etc., and control of soil erosion);

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

8) conduct experiments on various soils by testing new methods of treatment, of fertilizer application and other agrotechnical and improvement measures;

9) develop and apply new methods for the control of soil infiltration during irrigation and the construction of ponds;

10) study the chemical properties of water - river, lake, pond, and ground water for the purpose of economical utilization;

11) conduct systematic observations of the changes in soils under the influence of economic activity of man;

12) carry out inspection of the proper use of soils, of practicing thrift in relation to soil, and of adopting control measures against destructive processes;

13) realize the scientific basis for the agricultural measures adopted by the production plan;

14) conduct an analysis of fertilizers, plants, fodder etc.

The organization of a soil service in the direction outlined above is absolutely necessary at the present stage of agricultural development. The desirability and gainfulness of this measure is clear to everybody.

After careful consideration, the Soil Institute of the Academy of Sciences USSR must submit the given problem to the administrative agencies and bring about its realization.

In connection with the above, it is necessary to present also the problem of expanding the training of a highly qualified staff of soil scientists and agrochemists in Universities and advanced agricultural schools, the need of which is felt even now.

Voronezhskii Gosudarstvennyi Universitet [Voronezh State University]

Received at Editorial Office Jan. 20, 1954

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

A 808

Baliura, V. I.

Biologicheskie osobennosti i selektsiia kukuruzy v raionakh nechernozemnoi polosy.

[Biological characteristics and the selection of maize in regions of the non-chernozem belt].

In Burlakov, N. M., ed. Kukuruza v novykh raionakh. p.45-82. Moskva, Gosudarstvennoe Izdatel'stvo Sel'skokhoziaistvennoi Literatury, 1956. 59.22 B922

(In Russian)

Table 11. (p.60)

PHENOLOGICAL DATA OF A COLLECTION NURSERY

(seeding of May 31, sprouts of June 12)

No. in Consec. Order	Name of varieties and hybrids	Removal of tassels	Emergence of silks on ears	Flowering	Milk stage	Wax stage
1	Aivori-king [ivory]	20/VII	6/VIII	4/VIII	27/VIII	18/IX
2	Beloiaroe pshено [white spring millet]	12/VII	27/VII	22/VII	14/VIII	28/VIII
3	Minusinka	11/VII	22/VII	20/VII	14/VIII	28/VIII
4	Pervenets [First-ling]	11/VII	24/VII	22/VII	14/VIII	28/VIII
5	VIR No.4823	24/VII	7/VIII	5/VIII	30/VIII	15/IX
6	Chakinskaia zhemchu-zhina [Chakinsk Pearl]	13/VII	30/VII	27/VII	20/VII	6/IX
7	Poleskaia belaia [Forest Area White]	15/VII	31/VIII	29/VII	20/VIII	5/IX
8	Belaia sakharnaia [White Sugar]	22/VII	16/VIII	6/VIII	30/VIII	-
9	Kichkasskaia [Kichansk]	17/VII	28/VII	26/VII	19/VIII	3/IX
10	Bezenchukskaia 41 [Bezenchuk 41]	18/VII	30/VII	28/VII	22/VIII	6/IX
11	VIR No. 7134	9/VIII	30/VIII	21/VIII	-	--
12	Severo-Dakotskaia [North Dakota]	18/VII	17/VIII	7/VIII	30/VIII	-
13	Severianka [Northerner]	16/VII	28/VII	27/VII	23/VIII	7/IX
14	Voronezhskaia 76 [Voronezh 76]	18/VII	2/VIII	31/VII	24/VIII	7/IX
15	Voronezhskaia 80 [Voronezh 80]	18/VII	2/VIII	30/VII	22/VIII	7/IX

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Table 11. (continued)

No. in Consec. Order	Name of varieties and hybrids	Removal of tassels	Emergence of silks on ears	Flowering	Milk stage	Wax stage
16	Zakarpatskaia krasnaia [Transcarpathian Red]	26/VII	13/VIII	9/VIII	183/IX	-
17	VIR No. 657	28/VII	16/VIII	8/VIII	7/IX	-
18	Khar'kovskaia balaia zubovidnaia [Kharkov White Dent]	28/VII	16/VIII	7/VIII	7/IX	26/IX
19	VIR No. 1	28/VII	11/VIII	8/VIII	2/IX	16/IX
20	Kremnistaia zheltaia [Yellow flint]	8/VIII	24/VIII	17/VIII	17/IX	-
21	Moldavanka krasnaia [Moldavian Red]	28/VII	16/VIII	7/VIII	16/IX	-
22	VIR No. 407	20/VII	11/VIII	6/VIII	28/VIII	-
23	Grushevskaia [Pear-like]	29/VII	19/VIII	15/VIII	17/IX	-
24	VIR No. 42	1/VIII	12/VIII	9/VIII	3/IX	17/IX
25	VIR No. 7150	31/VII	19/VIII	17/VIII	16/IX	-
26	Sterling	30/VII	16/VIII	11/VIII	8/IX	-
27	VIR No. 33	2/VIII	15/VIII	12/VIII	7/IX	-
28	VIR No. 5272	15/VIII	28/VIII	17/VIII	-	-
29	Adzhametskaia belaia [Adzhametsk White]	9/VIII	28/VIII	19/VIII	-	-
30	VIR No. 316	28/VII	16/VIII	12/VIII	7/IX	-
31	VIR No. 310	5/VIII	23/VIII	15/VIII	10/IX	1/X
32	Abashskaia zheltaia [Abash Yellow]	15/VIII	29/VIII	22/VIII	-	-
33	Partizanka [Partisan]	30/VII	15/VIII	9/VIII	6/IX	-
34	Kartuli krugi	15/VIII	23/VIII	21/VIII	-	-
35	Minnesota 13 ekstra [Extra]	28/VII	11/VIII	6/VIII	30/VIII	23/IX
36	Imeretinskii gibrid [Imeretinsk Hybrid]	20/VIII	7/IX	30/VIII	-	-

Fig. 1. Varieties: 1--Aivori king, 2--Beloiaroe pshono, 3--Minusinka, 4--Pervenets, 5--VIR-4825, 6--Chakinskaia zhemchuzhina.

Fig. 2. Varieties: 7--Polesskaia belaia, 8--Belaia sakharnaia, 9--Kichkasskaia, 10--Bezenchukskaia 41, 11--VIR-7134.

Fig. 3. Varieties: 12--Severo-Dakotskaia [North Dakota], 13--Severianka, 14--Voronezhskaia 76, 15--Voronezhskaia 80, 16--Zakarpatskaia krasnaia,

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Fig. 4. Varieties: 17--VIR No. 667, 18--Khar'kovskaia belaia zubovidnaia [Kharkov White Dent], 19--Gibrid VIR-1, 20--Kremnistaia zheltaia [Flint Yellow], Moldavanka krasnukha.

Fig. 5. Varieties: 22--VIR No. 407, 23--Grushevskaia, 24--Gibrid VIR-42, 25--VIR No. 7150, 26--Sterling.

Fig. 6. Varieties: 27--Gibrid VIR-33, 28--VIR No. 5272, 29--Adzhametskaia belaia, 30--Gibrid VIR-316, 31--Gibrid VIR-310.

Fig. 7. Varieties: 32--Abashskaia zheltaia, 33--Partizanka, 34--Kartuli krugi, 35--Minnesota 13 ekstra, 36--Imeretinskii gibrid.

Fig. 8. Variety Tszi-iui-mi 23 avgusta [August] 1954.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

A 809

Kalinin, M. S., and Blinkova, M. V.

Sorta i gibridy kukuruzy, prigodnye dlia novykh raionov.

[Maize varieties and hybrids adaptable to new regions].

In Burlakov, N. M. ed. Kukuruza v novykh raionakh. pp.101-126. Moskva, Gosudarstvennoe Izdatel'stvo Sel'skokhoziaistvennoi Literatury, 1955. 69.22 B922

(In Russian)

P.101-104: A high maize yield depends largely on the right selection of the variety. It is known that different varieties produce different yields even under the same conditions. Our country has a large number of maize varieties distinct from each other as regards biological and economic characteristics, and adapted to the different zones of the land.

To make the correct selection of a variety, it is necessary to know the characteristics of all important varieties, to consider the extent to which the natural conditions of a given region are appropriate for the cultivation of the variety, and to what extent they answer the growth requirements of the variety concerned. In selecting a variety, it is essential to consider to what degree it can satisfy the economy's demands and supply it with grain fro human consumption and also with concentrated and succulent feeds.

Selection establishments are working to develop, within the shortest possible time, new varieties and, especially, hybrids that will prove fully adaptable to the natural conditions of the new regions cultivating maize. However, until the new varieties to be seeded in the new regions are developed, the existing maize varieties and hybrids must be used by means of importing

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

their seed from the old maize growing regions.

We are citing below the description of the most important maize varieties and hybrids that have passed State tests. We presume that the brief information concerning their productivity and early ripening, the height of the plants, resistance to diseases, and other data will help kolkhozes and sovkhozes to determine whether the individual varieties are appropriate for them.

Hybrid VIR-42 - double interlinear hybrid of the Kuban Experimental Station, All-Union Institute of Plant Industry. The seed of the first generation hybrid are obtained as a result of hybridizing two single interlinear hybrids: Slava [fame] (Line VIR-44 x Line VIR-38) - maternal form, and Svetoch [torch] (Line VIR-40 x Line VIR-43) paternal form. It is a medium ripening hybrid. Highly productive in the first generation under conditions of sufficient moisture, and also in semiarid regions. On the "Zhovten'" kolkhoz, Kamensk District, Cherkassk Oblast, the 1958 yield of this hybrid amounted to 95.8 centners of ears per hectare. The hybrid VIR-42 surpasses in productivity such distributed varieties as Dnepropetrovskaia, Minnesota 13 Ekstra [Extra], Sterling and others by 6-12 centners per hectare. In addition to the high yields of grain, the VIR-42 hybrid can produce up to 800 centners per hectare of ears and green mass. The plant reaches a height of 200 centimeters and above, its ears are large, weigh about 200 grams, and are situated at a height of 80-90 centimeters. The hybrid's resistance to lodging is high, but its stem is inclined to be fragile during ripening. The grain of the hybrid is Yellow Dent, weight per 1000 grains is about 250 grams. Resistance to Ustilago zeae infection is very high: it is resistant to Fusarium and slightly resistant to bacteriosis.

It was regionalized in 1962 in most of the steppe oblasts of the Ukrainian SSR, in the Rostov Oblast, the Krasnodar Territory, the Kabardinsk

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Autonomous SSR, and in the Moldavian SSR where it produces ripe grain; the grain reaches the milk-wax stage in the northern oblasts of the Ukrainian SSR, in the central-chernozem zone; and in a number of oblasts in the non-chernozem belt of the RSFSR. In 1954 the hybrid was tested in the new maize growing regions. At the Zonal Scientific-Research Institute of Agriculture of the North-East (City of Kirov), the hybrid produced a yield of ears with grain in the milk-wax stage and of green mass at the rate of 471 centners per hectare, at the Smolensk State Selection Station 391 centners respectively, at the "Krasnyi pakhar'" Experimental Base of VIR (near Leningrad) - 480 centners, on the "Volia pakharia" kolkhoz, Krasnosel'sk District, Leningrad Oblast - 564 centners, on the "Iskra" kolkhoz, Vsevologda District, Leningrad Oblast - 450 centners, at the Iaroslav State Selection Station - 451 centners per hectare.

Hybrid VIR-25 - double interlinear hybrid of the Kuban Experimental Station of the All-Union Institute of Plant Industry. Seed of the first generation hybrid are obtained by hybridizing two single interlinear hybrids: Iskra [Spark] (Line VIR-26 x Line VIR-27) - maternal form, and Ideal (Line-28 x Line VIR-29)- paternal form.

Productivity in the first generation is very high - exceeds that of the Dnepropetrovskaia, Khar'kovskaia 23, and other varieties by 7-10 centners per hectare. At the Piriatinsk test plot, Poltava Oblast, the 1953 grain yield of the hybrid amounted to 75.7 centners per hectare. In 1954, the Gor'kii State Complex [kompleksnaia] Station for Agriculture obtained a 455.8 centners per hectare yield of green mass, including 210 centners of ears with grain in the milk-wax stage. The hybrid ripens comparatively early, is drought resistant and fairly tall (180--200--250 centimeters); the ears are large, weigh about 200 grams and are situated at a height of 50-70 centimeters and

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

higher. Resistance to lodging inadequate. The grain is White Dent, weight per 1000 grains is 250-300 grams; grain has increased starch content. Resistance to Ustilago zeae is very high; resistance to Fusarium and bacteriosis infection average.

Hybrid was regionalized in 1952 in the forest-steppe zone of the Ukrainian SSR, in Moldavia and in the Kabardinsk Autonomous SSR. For separate silaging of ears in the milk-wax stage and for the production of green mass, the hybrid can be grown in the central-chernozem zone and in a number of regions of the non-chernozem belt...

Fig. 1. Hybrid VIR-42.

[List of varieties:]

Gibrid Bukovinskii I [Bukovinsk Hybrid]

Gibrid Uspekh [Hybrid Success]

Krasnodarskaia 1/49 [Krasnodar 1/49]

Sort Partizanka [Partisan Variety]

Sort Sterling [Sterling Variety]

Sort Liming [Leaming Variety]

Sort Severodakotskaia [North Dakota Variety]

Sort Minnesota 13 Ekstra [Minnesota 13 Extrary Variety]

Sort Dnepropetrovskaia [Dnepropetrovsk Variety]

Sort Zakarpatskaia zheltaia zubovidnaia [Transcarpathian Yellow Dent]

Sort Kichkasaia [probably Kichkasck Variety]

Sort Osetinskaia belaia zubovidnaia [Osetinsk White Dent]

Sort Grushevskaia mestnaia [Grushev Local Variety]

Sort Zhemchuzhina chakinskaia [Chakinsk Pearl Variety]

Gibrid voronezhskii [Voronezh Hybrid]

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Gibrid skorospelyi [Early Ripening Hybrid]

Sort Voronezhskaia 76 [Voronezh 76 Variety]

Sort Voronezhskaia 80 [Voronezh 80 Variety]

Sort Bezenchukskaia 41 [Bezenchuk 41 Variety]

Sort Slavgorodskaia 270 [Slavgorod 270 Variety]

Sort Spasovskaia [Spasov or Spassk Variety]

* * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

A 810

Sokolov, B. N.

Moshchnoe sredstvo povysheniia urozhainosti kukuruzy.

[Powerful means of increasing the productivity of maize].

In Burlakov, N. M. ed. Kukuruza v novykh raionakh. p.83-87. Moskva, Gosudarstvennoe Izdatel'stvo Sel'skokhoziaistvennoi Literatury, 1955. 69.22 B922

(In Russian)

Scientific research data and production practice confirm the fact that hybrid plants of the first generation utilize a superior agrotechnical background to the full extent.

Maize hybrids give greatest returns for the cost of their cultivation. With the year to year increase of maize culture, the seeding of low production varieties is becoming an economic disadvantage.

The common population-varieties [sorta-populiatsii] still seeded in a number of districts should, in the nearest future, be replaced with regionalized hybrids possessing great potentials of productivity.

Increased vigor and vitality of first generation hybrids, or heterosis, as this phenomenon was later called, is one of the most important biological factors in increasing the productivity of maize and some other agricultural crops.

The precedence of discovering heterosis in agricultural plants is incorrectly associated with the American continent. Americans, to be sure, have made use of the great effectiveness of heterosis, they have done much in the sphere of maize selection, have organized a system of enterprises growing

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

hybrid seed, and have created a market for them. If, however, heterosis is regarded as a scientific problem, then the honor of obtaining the first plant hybrid, of describin heterotic forms, and of suggesting that they be used for practical purposes belongs to Russian science. As early as 1760, botanist Kel'reiter, [Joseph Gottlieb Koelreuter, (1733-1806)] a professor at the Russian Academy of Sciences, obtained the first plant hybrid by crossing two tobacco species, after he had conducted numerous unsuccessful experiments with different plants. [Begin p.84] The hybrid obtained had greater size than its parents, possessed a more intensive growth, and was distinguished by earlier and more abundant flowering. It is especially important that the ripening phase and the yellowing of leaves commenced in the hybrid earlier than in the original forms. And, although this hybrid was distinguished by complete sterility, it, nonetheless, was of considerable practical interest as a result of its great productivity.

With his works, Kel'reiter began a new page in the history of botany. Having produced the first plant hybrid, Kel'reiter noticed increased capacity to live and productivity in the hybrid plants. He was the first to establish scientifically and to describe the phenomenon which considerably later - at the beginning of the 20th century - was called heterosis, and he suggested using this phenomenon in agricultural practice.

Later, the problem of obtaining and using plant hybrids was developed with great care in the teaching of the great transformer of nature, I. V. Michurin. Having begun his works in the year 1875, I. V. Michurin, on the basis of his theory of hybridizing and rearing hybrid seedlings, created a large number of remarkable varieties of fruit and berry plants, demonstrating brilliantly the superiority of first generation hybrid plant forms and the great effectiveness of their application to practical purposes. Michurin's

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

varieties are hybrids of the first generation propagated vegetatively.

The first experiments in hybridising maize in our country date back to the year 1910. They were begun by V. V. Talanov on experimental plots located on the territory of the present Dnepropetrovsk Oblast. The experiments, however, unfolded fully only under Soviet rule. In 1930 we, for the first time in the post-revolutionary period, entered upon an extensive program of research with maize hybrids at the Institute of Maize [Institut Kukuruzy] and later at the Ukrainian Scientific-Research Institute of Grain Economy; these investigations demonstrated the feasibility and simplicity of producing first generation hybrid seed and their considerable effectiveness compared with the parent components used in crossing. [Begin p.86].

Soviet selectionists have now created a whole series of highly productive hybrids. Depending upon the original forms used in crossing, the hybrids are divided into intervarietal, line-varietal and interlinear.

According to data of the State Committee for Variety Testing of Agricultural Crops, intervarietal hybrids, such as Pervenets [Firstling], Odesskii 1, [Odessa 1], and Donskoi [Don], surpass the productivity of ordinary varieties by 10-16 percent; line-varietal hybrids, such as Uspekh [Success] and Kollektivnyi [Collective], exceed the yield by 20 percent. The double interlinear hybrids VIR-42, VIR-26, VIR-37 etc. are particularly distinguished by productivity; they surpass population-varieties [ordinary sorts] by 8-12 centners per hectare, or up to 30 percent and higher.

As a results of switching over to mass seeding of maize from hybrid seeds, the national economy of our country will be able to gain millions of centners of additional grain per year at a very small cost of growing hybrid seed.

Many leading kolkhozes on which the importance of hybrid seed was evaluated according to quality, have long since been using them for seeding.

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Following [the example of] the leading kolkhozes, whole oblasts have gone over to mass seeding of maize from hybrid seed.

Thus, for example, in the Dnepropetrovsk Oblast maize crops from hybrid seed comprised 78.4 percent of the entire area under maize as early as 1952, and in 1953-1954 they had reached over 85 percent of this area.

However, as a result of the yearly failure to fulfil the plan for growing seed on hybridization plots, very large areas are still cropped to little productive seed of the second and subsequent generations. Such underestimation of the qualities of hybrid seed leads to an annual shortage in maize yield.

Mention must be made also of the absence of a unanimous viewpoint concerning the effectiveness of the first and subsequent generations of hybrid seed. For want of sufficiently verified experimental data, individual scientific workers have begun to spread information to the effect that the productivity of second generation hybrid seed does not drop, but even increases when supplementary pollination [Begin p.86] and selection of the best ears on hybridization plots are practiced.

There have also been other opponents of growing hybrid seed annually who have recommended a so-called "fixing of heterosis" by individual selection of ears on crops of the second and subsequent generations.

Years of investigations in the realm of animal husbandry and also in plant cultivation, supported by a great deal of factual material, fail to confirm the accuracy of the recommendations made by the supporters of subsequent hybrid generations, and speak in favor of the effectiveness of the first generation only. Attempts at "fixing heterosis" were unsuccessful. They were refuted by a bulk of material of research institutions, by the State Committee for Variety Testing of Agricultural Crops, and by data from practice, particularly,

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

by data from the imeni Chkalov kolkhoz, Novo-Moscow District, Dnepropetrovsk Oblast. In 1949, under conditions of comparative commercial testing, the yield obtained by this kolkhoz from crops of first generation hybrid seed exceeded the yield obtained from crops of second generation seed by 10.6 centners of maize in ears.

The eminent Russian scientist, I. V. Michurin, who produced his remarkable varieties of fruit and berry plants from the seedlings of first generation hybrids, was so unfavorably impressed by hybrids of the second generation that he considered working with them as useless.

The decree of the January Plenum of the TsK KPSS [Central Committee of Communist Party of Soviet Union] provides that production of hybrid seed must be organized on the premise of switching over to seeding maize from hybrid seed only within the next 2-3 years.

The production of hybrid seed is an important measure and of great significance to the national economy. At present we do not yet have at our disposal any more effective method of increasing maize productivity by means of selection than the method of using seed of first generation hybrids.

For the purpose of speedy adaptation of maize hybrids to commercial crops, it is essential that the work of the individual groups of the seed growing system - selection establishments, elite farms and raisemkhozes [district seed growing kolkhozes] - be clearly defined and well managed.

Special attention must be directed to the growing of seed on hybridization plots on kolkhozes and sovkhozes.

Concomitantly with the economic adaptation of hybrids, it is essential to conduct extensive, scientific-research work aimed toward creating new, highly productive hybrids for the various soils and climates in the different regions of our country, and toward finding more efficient and effective

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8

methods of growing hybrid seed.

* * * *

Declassified and Approved For Release 2013/09/18 : CIA-RDP80R01426R010300020001-8